Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate AC Control Circuit High	B2A01	This DTC will detect when the sensed voltage of HVAC HMI FFPAC Switch is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the AC switch raw voltage signal to the BCM for fault maturation. This DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the voltage is greater than or equal to the OORH threshold then the BCM shall set the fault status to set to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Compressor Setting Raw Voltage	>= 2.80 V	Diagnostc is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate AC Control Circuit Low	B2A02	This DTC will detect when the sensed voltage of HVAC HMI FFPAC Switch is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the AC switch raw voltage signal to the BCM for fault maturation. This DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to OORL threshold then the BCM shall set the fault status to set to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Compressor Setting Raw Voltage	<= 0.60 V	Diagnostc is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate AC Control Performance Rationality	B2A04	This DTC will detect when the HVAC HMI FFP AC Switch is stuck on for more than a calibrated amount of time. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the AC switch raw voltage signal to the BCM for fault maturation. This DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the upper fault threshold and is greater than or equal to lower fault threshold, and the wait timer is expired then the diagnostic will report a FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Compressor Setting Raw Voltage is between AND for	<= 2.70 V >= 1.30 V >90.00 sec	Diagnostics is Enabled No Active DTCs	**B2A01, B2A02, U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP)Air Distribution Discrete Control Front Left(1) Circuit High	B2A16	This DTC will detect when the sensed voltage of HVAC HMI Air Distribution Discrete Control Front Left Switch is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete controls front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the voltage is greater than or equal to the OORH threshold then the BCM shall set the fault status to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Air Distribution Front left Raw Voltage 1 is	>= 2.80 V	Diagnostic is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP)Air Distribution Discrete Control Front Left(1) Circuit Low	B2A17	This DTC will detect when the sensed voltage of HVAC HMI Air Distribution Discrete Control Front Left Switch is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete controls front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to OORL threshold then the BCM shall set the fault status to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Air Distribution Front Left Raw Voltage 1 is	<= 0.60 V	Diagnostic is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP) Air Distribution Discrete Control Front Left(1) Performance	B2A19	This DTC will detect when the HVAC HMI FFP Air Distribution Discrete Control Switch Front Left is stuck on for more than a calibrated amount of time. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete control front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the upper fault threshold and is greater than or equal to lower fault threshold, and the wait timer is expired then the diagnostic will report a FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Air Distribution Front Left Raw Voltage 1 is between AND FOR	>= 1.30 V <= 2.70 V >90.00 sec	Diagnostics is Enabled No DTCs	**B2A16, B2A17, U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP)Air Distribution Discrete Control Front Left (2) Circuit High	B2A1A	This DTC will detect when the sensed voltage of HVAC HMI Air Distribution Discrete Control Front Left Switch is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete controls front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the voltage is greater than or equal to the OORH threshold then the BCM shall set the fault status to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Air Distribution Front left Raw Voltage 2 is	>= 2.80 V	Diagnostic is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP)Air Distribution Discrete Control Front Left (2) Circuit Low	B2A1B	This DTC will detect when the sensed voltage of HVAC HMI Air Distribution Discrete Control Front Left Switch is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete controls front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to OORL threshold then the BCM shall set the fault status to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Air Distribution Front Left Raw Voltage 2 is	<= 0.60 V	Diagnostic is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP) Air Distribution Discrete Control Front Left (2) Performance	B2A1D	This DTC will detect when the HVAC HMI FFP Air Distribution Discrete Control Switch Front Left is stuck on for more than a calibrated amount of time. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete control front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the upper fault threshold and is greater than or equal to lower fault threshold, and the wait timer is expired then the diagnostic will report a FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Air Distribution Front Left Raw Voltage 2 is between AND FOR	>= 1.30 V <= 2.70 V >90.00 sec	Diagnostic is Enabled No Active DTCs	 **B2A1A, B2A1B, U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP)Air Distribution Discrete Control Front Left (3) Circuit High	B2A1E	This DTC will detect when the sensed voltage of HVAC HMI Air Distribution Discrete Control Front Left Switch is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete controls front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the voltage is greater than or equal to the OORH threshold then the BCM shall set the fault status to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Air Distribution Front left Raw Voltage 3 is	>= 2.80 V	Diagnostic is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP)Air Distribution Discrete Control Front Left (3) Circuit Low	B2A1F	This DTC will detect when the sensed voltage of HVAC HMI Air Distribution Discrete Control Front Left Switch is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete controls front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to OORL threshold then the BCM shall set the fault status to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Air Distribution Front Left Raw Voltage 3	<= 0.60 V	Diagnostic is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate (FFP) Air Distribution Discrete Control Front Left (3) Performance	B2A21	This DTC will detect when the HVAC HMI FFP Air Distribution Discrete Control Switch Front Left is stuck on for more than a calibrated amount of time. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Air distribution discrete control front left switch raw voltage signals to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the upper fault threshold and is greater than or equal to lower fault threshold, and the wait timer is expired then the diagnostic will report a FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Air Distribution Front Left Raw Voltage 3 is between AND FOR	>= 1.30 V <= 2.70 V 90.00 sec	Diagnostic is Enabled No Active DTCs	 **B2A1E, B2A1F, U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Front HVAC AUTO Control Circuit High	B2A36	This DTC will detect when the sensed voltage of HVAC HMI FFP AUTO Switch is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the AUTO switch raw voltage signal to the BCM for fault maturation. This DTC is an X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the voltage is greater than or equal to the Out of Range High threshold then the BCM shall set the fault status to set to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front HVAC AUTO Raw Voltage	>= 2.80 V	Diagnostics is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Front HVAC AUTO Control Circuit Low	B2A37	This DTC will detect when the sensed voltage of HVAC HMI FFP AUTO Switch is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the AUTO switch raw voltage signal to the BCM for fault maturation. This DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to Out of Range Low threshold then the BCM shall set the fault status to set to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front HVAC AUTO Raw Voltage	<= 0.60 V	Diagnostics is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Front HVAC AUTO Control Performance	B2A39	This DTC will detect when the HVAC HMI FFP AUTO switch is stuck on for more than a calibrated amount of time. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the AUTO switch raw voltage signal to the BCM for fault maturation. This DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the upper fault threshold and is greater than or equal to lower fault threshold, and the wait timer value is expired then the diagnostic will report a FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front HVAC AUTO Raw Voltage is between AND FOR	>= 1.30 V <= 2.70 V >90.00 sec	Diagnostics is Enabled No Active DTCs	 **B2A36, B2A37, U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Blower Continuous Control Front (1) Circuit High	B2A3E	This DTC will detect when the sensed voltage of HVAC FFP Blower Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Blower Continuous Knob raw voltage signals for circuits 1 and 2 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or FAIL status. When the accumulated FAIL	Front Face Plate Request Blower Level Front Raw Voltate (1) is	>= 2.80 V	Diagnostics is Enabled No Active Communication DTC	 **U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Blower Continuous Control Front (1) Circuit Low	B2A3F	This DTC will detect when the sensed voltage of HVAC FFP Blower Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Blower Continuous Knob raw voltage signals for circuits 1 and 2 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or FAIL status. When the accumulated FAIL	Front Face Plate Request Blower Level Front Raw Voltate (1) is	<= 0.60 V	Diagnostis is Enabled No Active Communication DTC	 **U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Blower Continuous Control Front (1) Performance	B2A41	This DTC will detect when there is a malfunction with the HVAC FFP Blower Continuous Knob, such as when either of the two output circuits for the encoder fail Out of Range or become stuck in range. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Blower Continuous Knob raw voltage signals for circuits 1 and 2 as well as the Circuit Correlation status signal (Pass Criteria met, Fail Criteria met, Intermediate) to the BCM. The BCM accumulates the number of Pass Criteria met signals versus Fail Criteria met signals and when the number of failures from the FFP exceed the calibrated failure threshold, then a FAIL is reported by the BCM. The BCM reports a PASS only when the accumulated number of FAILs go below the calibrated failure threshold and the last Circuit Correlation	Number of 1's in Front Faceplate Request Blower Level Front Correlation Array is	>= 5.00	Diagnostics is Enabled Front Faceplate Request Blower Level Front Circuit Correlation is NOT equal to No Active DTC	 **Indeterminate** **B2A3E, B2A3F, U0164, U0424**		Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		status signal received by the BCM is a Pass Criteria met. This DTC is not an X out of Y diagnostic. It uses an accumulation of Passes and Fails to determine diagnostic maturation in the BCM (DECECU).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Blower Continuous Control Front (2) Circuit High	B2A42	This DTC will detect when the sensed voltage of HVAC FFP Blower Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Blower Continuous Knob raw voltage signals for circuits 1 and 2 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or FAIL status. When the accumulated FAIL	Front Face Plate Request Blower Level Front Raw Voltate (2) is	>= 2.80 V	Diagnostics is Enabled No Active Communication DTC	 **U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Blower Continuous Control Front (2) Circuit Low	B2A43	This DTC will detect when the sensed voltage of HVAC FFP Blower Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Blower Continuous Knob raw voltage signals for circuits 1 and 2 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or FAIL status. When the accumulated FAIL	Front Face Plate Request Blower Level Front Raw Voltate (2) is	<= 0.60 V	Diagnostis is Enabled No Active Communication DTC	 **U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Max Defrost Control Circuit High	B2A67	This DTC will detect when the sensed voltage of HVAC HMI FFP Max Defrost Switch is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Max Defrost switch raw voltage signal to the BCM for fault maturation. This DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the voltage is greater than or equal to the OORH threshold then the BCM shall set the fault status to set to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front Defrost Raw Voltage is	>= 2.80 V	Diagnostics is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Max Defrost Control Circuit Low	B2A68	This DTC will detect when the sensed voltage of HVAC HMI FFP Max Defrost Switch is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Max Defrost switch raw voltage signal to the BCM for fault maturation. This DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the voltage is less than or equal to OORL threshold then the BCM shall set the fault status to set to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front Defrost Raw Voltage is	<= 0.60 V	Diagnostics is Enabled No Active Communication DTC	 **U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Max Defrost Control Performance	B2A6A	This DTC will detect when the HVAC HMI FFP Max Defrost Switch is stuck on for more than a calibrated amount of time. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends Max Defrost switch raw voltage signal to the BCM for fault maturation. This DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the voltage is less than or equal to the upper fault threshold and is greater than or equal to lower fault threshold, and the wait timer value is greater the required threshold then the diagnostic will report a FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front Defrost Raw Voltage is between AND FOR	>= 2.70 V <= 1.30 V >90.00 sec	Diagnostics is Enabled No Active DTCs	 **B2A67, B2A68, U0164, U0424**	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Power Front Control Circuit High	B2A6B	This DTC will detect when the sensed voltage of HVAC HMI FFP Power Switch is Out of Range High (OORH). The DTC is enabled when the enable criteria is met and will run continuously. The BCM monitors the raw voltage signal and matures the fault. This DTC is a X out of Y diagnostic. If the voltage is greater than or equal to the OORH threshold then the BCM shall set the fault status to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front HVAC Power Voltage is	> 4.30 V	Diagnostics is Enabled ECU initialization for	 >= 0.25 sec	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Power Front Control Circuit Lower	B2A6C	This DTC will detect when the sensed voltage of HVAC HMI FFP Power Switch is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met and will run continuously. The BCM monitors the raw voltage signal and matures the fault. This DTC is a X out of Y diagnostic. If the voltage is less than or equal to OORL threshold then the BCM shall set the fault status to FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front HVAC Power Voltage is	<1.40V	Diagnostics is Enabled ECU initialization for	>= 0.25 sec	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Power Front Control Performance	B2A6E	This DTC will detect when the HVAC HMI FFP Power Switch is stuck on for more than a calibrated amount of time. The DTC is enabled when the enable criteria is met and will run continuously. The BCM monitors the raw voltage signal and matures the fault. This DTC is a X out of Y diagnostic. If the voltage is less than or equal to the upper fault threshold and is greater than or equal to lower fault threshold, and the wait timer is expired then the diagnostic will report a FAIL. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported.	Front Faceplate Request Front HVAC Power Voltage is between AND FOR	>= 1.30 V <= 2.70 V >90.00 sec	Diagnostics is Enabled No Active DTC ECU initialization for	 **B2A6B, B2A6C** >=0.25 sec	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 1 Left Circuit High	B2A87	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Left Out of Range High (1)is Front Faceplate Temperature Continuous DECECU Front High Delta X (1) is Front Faceplate Temperature Continuous DECECU Front Failure Ratio (1) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 1 Left Circuit Low	B2A88	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Left Out of Range Low (1) is Front Faceplate Temperature Continuous DECECU Front Low Delta X (1) is Front Faceplate Temperature Continuous DECECU Front Failure Ratio (1) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 1 Left Performance	B2A8A	This DTC will detect when there is a malfunction with the HVAC FFP Temperature Continuous Knob, such as when either of the two output circuits for the encoder fail Out of Range or become stuck in range. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 and 2 as well as the Circuit Correlation status signal (Pass Criteria met, Fail Criteria met, Intermediate) to the BCM. The BCM accumulates the number of Pass Criteria met signals versus Fail Criteria met signals and when the number of failures from the FFP exceed the calibrated failure threshold, then a FAIL is reported by the BCM. The BCM reports a PASS only when the accumulated number of FAILs go below the calibrated failure threshold and the last	Number of failure criteria met in the Front Faceplate Request Temperature Front Left Correlation Array is	>= 5.00	Diagnostics is Disabled Front Faceplate Request Temperature Front Left Correlation is not No Active DTC	 **Indeterminate** **B2A87, B2A88, U0164, U0424**		Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Circuit Correlation status signal received by the BCM is a Pass Criteria met. This DTC is not an X out of Y diagnostic. It uses an accumulation of Passes and Fails to determine diagnostic maturation in the BCM (DECECU).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 2 Left Circuit High	B2A8B	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front (2) Left Raw Voltage is Front Faceplate Request Temperature Level Front Left Out of Range High (2) is Front Faceplate Temperature Continuous DECECU Front High Delta X (2) is Front Faceplate Temperature Continuous DECECU Front Failure Ratio (2) is AND	=TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 2 Left Circuit Low	B2A8C	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front (2) Left Raw Voltage is Front Faceplate Request Temperature Level Front Left Out of Range Low (2) is Front Faceplate Temperature Continuous DECECU Front Low Delta X (2) is Front Faceplate Temperature Continuous DECECU Front Failure Ratio (2) is AND	= TRUE >= 400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 3 Left Circuit High	B2A8F	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front (3) Left Raw Voltage is Front Faceplate Request Temperature Level Front Left Out of Range High (3) is Front Faceplate Temperature Continuous DECECU Front High Delta X (3) is Front Faceplate Temperature Continuous DECECU Front Failure Ratio (3) is AND	=TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 3 Left Circuit Low	B2A90	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Left Out of Range Low (3) is Front Faceplate Temperature Continuous DECECU Front Low Delta X (3) is Front Faceplate Temperature Continuous DECECU Front Failure Ratio (3) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	U0164, U0424	4 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 1 Right Circuit High	B2A93	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range High (1)is Front Faceplate Temperature Continuous DECECU Front Right High Delta X (1) is Front Faceplate Temperature Continuous DECECU Front Right Failure Ratio (1) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 1 Right Circuit Low	B2A94	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range Low (1) is Front Faceplate Temperature Continuous DECECU Front Right High Delta X (1) is Front Faceplate Temperature Continuous DECECU Front Failure Ratio (1) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 1 Right Performance	B2A96	This DTC will detect when there is a malfunction with the HVAC FFP Temperature Continuous Knob, such as when either of the two output circuits for the encoder fail Out of Range or become stuck in range. The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 and 2 as well as the Circuit Correlation status signal (Pass Criteria met, Fail Criteria met, Intermediate) to the BCM. The BCM accumulates the number of Pass Criteria met signals versus Fail Criteria met signals and when the number of failures from the FFP exceed the calibrated failure threshold, then a FAIL is reported by the BCM. The BCM reports a PASS only when the accumulated number of FAILs go below the calibrated failure threshold and the last	Number of failure criteria met in the Front Faceplate Request Temperature Front Left Correlation Array is	>= 5.00	Diagnostics is Disabled Front Faceplate Request Temperature Front Left Correlation is not No Active DTC	 **Indeterminate** **B2A93, B2A94, U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Circuit Correlation status signal received by the BCM is a Pass Criteria met. This DTC is not an X out of Y diagnostic. It uses an accumulation of Passes and Fails to determine diagnostic maturation in the BCM (DECECU).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 2 Right Circuit High	B2A97	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range Low (4) is Front Faceplate Temperature Continuous DECECU Front Right Low Delta X (4) is Front Faceplate Temperature Continuous DECECU Front Right Failure Ratio (4) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	 **U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 2 Right Circuit Low	B2A98	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range Low (2) is Front Faceplate Temperature Continuous DECECU Front Right Low Delta X (2) is Front Faceplate Temperature Continuous DECECU Front Right Failure Ratio (2) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 3 Right Circuit High	B2A9B	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range High (3) is Front Faceplate Temperature Continuous DECECU Front Right High Delta X (3) is Front Faceplate Temperature Continuous DECECU Front Right Failure Ratio (3) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 3 Right Circuit Low	B2A9C	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range Low (3) is Front Faceplate Temperature Continuous DECECU Front Right Low Delta X (3) is Front Faceplate Temperature Continuous DECECU Front Right Failure Ratio (3) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Circuit Performance	B2AFF	This DTC will detect when difference between Blower Motor commanded speed and feedback speed exceeds threshold. X out of Y will determine fault maturation and when to set the DTC.	Difference between Front blower speed commanded duty cycle and Front blower speed feedback actual duty cycle	>= 20 % AND <= -20 %	All of the following conditions are met: Front Blower Speed Diagnostic Enabled calibration is **TRUE** Front Blower Check Performance Diagnostic Enabled calibration is **TRUE** Controller is awake Front blower power short fault status Front blower ground short fault status Front blower open fault status Front blower feedback Duty Cycle percent Front blower feedback Duty Cycle percent Front blower feedback frequency (Hz) No Active DTC Commanded front blower speed current and previous duty cycle has changed by:	= TRUE = TRUE = TRUE # Fault / Fault / Fault !(>= 0.00 & <= 10.00) !(>= 90.00 & <= 100.00) (>45.00 & < 250.00) B2B00, B2B01, B2B02, B2B03, B2B0B, B2B0C <= 1 %	8.00 seconds out of a 10.00 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					wait for: Commanded front blower Speed Duty cycle All of the following conditions are met for: Condition 1: Climate System Mode is changed to: then Wait for: or Condition 2: Outside Air Temperature Filtered Condition 3: Commanded front blower Speed duty cycle	>= 10.0 sec >10.0% Propulsion or Ignition On >=30.0 sec <= 30.0 degC <= 50.0%		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Circuit High	B2B00	Blower Motor Speed Circuit High Diagnostic will detect short-to-voltage circuit fault on the Blower Motor Speed Command wire between the blower motor and the BCM. X out of Y will determine fault maturation and when to set the DTC.	Front blower power short fault status (BSP signal)	= CeHVC_FBFD_FAULT	All of the following conditions are met: Front Blower Speed Diagnostic Enabled calibration is **TRUE** Front Blower Check High Diagnostic Enabled calibration is **TRUE** Controller is awake Front blower power short fault status Commanded Front Blower Speed Duty Cycle	 = TRUE = TRUE = TRUE # Indeterminate > 0 %	0.15 seconds out of a 0.20 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Circuit Low	B2B01	Blower Motor Speed Circuit Low Diagnostic will detect short-to-ground and open circuit faults on the Blower Motor Speed Command wire between the blower motor and the BCM. X out of Y will determine fault maturation and when to set the DTC.	Any of the following conditions are met: Front blower ground short fault status Front blower open fault status (BSP signals)	 = CeHVC_FBFD_FAULT = CeHVC_FBFD_FAULT	All of the following conditions are met: Front Blower Speed Diagnostic Enabled calibration is **TRUE** Front Blower Check High Diagnostic Enabled calibration is **TRUE** Controller is awake Front blower ground short fault status Front blower open fault status Commanded Front Blower Speed Duty Cycle	 = TRUE = TRUE = TRUE # Indeterminate # Indeterminate = 0 %	4.00 seconds out of a 5.00 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Return Circuit High	B2B02	Blower Motor Speed Return Circuit High Diagnostic will detect short-to-voltage and open circuit faults on the Blower Speed Feedback wire between the blower motor and the BCM. X out of Y will determine fault maturation and when to set the DTC.	Front Blower Feedback Duty Cycle	>= 0 % And <= 10 %	All of the following conditions are met: Front Blower Speed Diagnostic Enabled calibration is **TRUE** Front Blower Return Check High Diagnostic Enabled calibration is **TRUE** Controller is awake Commanded Front Blower Speed Duty Cycle	 = TRUE = TRUE = TRUE >10.0%	8.00 seconds out of a 10.00 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Return Circuit Low	B2B03	Blower Motor Speed Return Circuit Low Diagnostic will detect short-to-ground circuit faults on the Blower Speed Feedback wire between the blower motor and the BCM. X out of Y will determine fault maturation and when to set the DTC.	Front Blower Feedback Duty Cycle	<= 100 % And >= 90 %	All of the following conditions are met: Front Blower Speed Diagnostic Enabled calibration is **TRUE** Front Blower Return Check Low Diagnostic Enabled calibration is **TRUE** Controller is awake Commanded Front Blower Speed Duty Cycle	 = TRUE = TRUE = TRUE >10.0%	8.00 seconds out of a 10.00 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Left Front Temp Actuator Performance Diagnostic	B2B05	This DTC will detect when the Temp Door travels to its commanded position within the full dynamic range and fails to reach the end of the commanded position short of a calibrated tolerance. This DTC is enabled when the enable criteria of this diagnostics is met and it is an X of Y diagnostic. This is a continuous diagnostic and runs during normal operation of vehicle. This DTC runs when the actuator door is commanded to move to a desired position, the request of which comes from customer through HVAC Actuator Controls algorithm.	**Failure Case 1:** All of the conditions are met: Front Left Temp Actuator LIN Actuator Retry Number Front Left Temp Actuator Actual Position Front Left Temp Actuator Performance Diagnostic Allowable Stalled Movement Range Front Left Temp Actuator Performance Diagnostic Stall Detected Actuator travel must not be moving toward an end stop within a margin: Low End High End	> 3 # Front Left Temp Actuator Future Position Desired # Normal = End Stop Detected < 10.00 pct > 90.00 pct	Diagnostic is Enabled Front Left Temp Actuator Diagnostics Global enable Calibration is TRUE No Active Loss of Communication DTC's Front Left Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is True b) All of the following are met: i) Front Left Temp Actuator Performance Diagnostic Allowable Stalled Movement Range is equal to Normal "ii) Front Left Temp Actuator Actual position > "iii) Front Left Temp Actuator Actual position <	= TRUE U0659 B2B2A =TRUE =Normal > Front Left Temp Actuator Performance Diagnostic Future Position Desired MINUS 5,000.00 < Left Front Temp Actuator Performance Diagnostic Future Position Desired PLUS 5,000.00	Up to 4.80 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					iV) Front Left Temp Actuator Learn Retry Count (counter has not expired)	< 3		
			Failure Case 2: **All of the conditions are met:** Front Left Temp Actuator Learn Retry Count Front Left Temp Actuator Performance Diagnostic Stall Detected	> 3 = End Stop Detected	Diagnostic is Enabled Front Left Temp Actuator Diagnostics Global enable Calibration is TRUE No Active Loss of Communication DTC's Front Left Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is True b) All of the following are met: i) Front Left Temp Actuator Performance Diagnostic Allowable Stalled Movement Range is equal to Normal "ii) Front Left Temp Actuator Actual position >	= TRUE U0659 B2B2A =TRUE =Normal > Front Left Temp	Up to 4.80 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					"iii) Front Left Temp Actuator Actual position <	Actuator Performance Diagnostic Future Position Desired MINUS 5,000.00 < Left Front Temp Actuator Performance Diagnostic Future Position Desired PLUS 5,000.00		
					iV) Front Left Temp Actuator Learn Retry Count (counter has not expired)	< 3		
			Failure Case 3: **All of the conditions are met:**		Diagnostic is Enabled		120.00 s	
					Front Left Temp Actuator Diagnostics Global enable Calibration is TRUE	= TRUE		
			Front Left Temp Actuator Future Position Performance Fail Timer	> 120.00 s	No Active Loss of Communication DTC's	U0659		
			Any of the conditions below are satisfied:		Front Left Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active	B2B2A		
			a) Front Left Temp Actuator Actual Position	< Front Left Temp Actuator Future Position Commanded - 5,000 steps	Only one of the following condition (a) or (b) is met:			
					a) Diagnostic failure is True	=TRUE		
			b) Front Left Temp Actuator Actual Position	> Front Left Temp Actuator Future Position Commanded+ 5,000 steps	b) All of the following are met:			
					i) Front Left Temp Actuator Performance Diagnostic Allowable Stalled Movement Range			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					is equal to Normal "ii) Front Left Temp Actuator Actual position > "iii) Front Left Temp Actuator Actual position < iV) Front Left Temp Actuator Learn Retry Count (counter has not expired)	=Normal > Front Left Temp Actuator Performance Diagnostic Future Position Desired MINUS 5,000.00 < Left Front Temp Actuator Performance Diagnostic Future Position Desired PLUS 5,000.00 <3		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Right Front Temp Actuator Performance Diagnostic	B2B06	This DTC will detect when the Temp Door travels to its commanded position within the full dynamic range and fails to reach the end of the commanded position short of a calibrated tolerance. This DTC is enabled when the enable criteria of this diagnostics is met and it is an X of Y diagnostic. This is a continuous diagnostic and runs during normal operation of vehicle. This DTC runs when the actuator door is commanded to move to a desired position, the request of which comes from customer through HVAC Actuator Controls algorithm.	**Failure Case 1:** All of the conditions are met: Front Right Temp Actuator LIN Actuator Retry Number Front Right Temp Actuator Actual Position Front Right Temp Actuator Performance Diagnostic Allowable Stalled Movement Range Front Right Temp Actuator Performance Diagnostic Stall Detected Actuator travel must not be moving toward an end stop within a margin: Low End High End	> 3 # Front Right Temp Actuator Future Position Desired # Normal = End Stop Detected <10.00 pct > 90.00 pct	Diagnostic is Enabled Front Right Temp Actuator Diagnostics Global enable Calibration is TRUE No Active Loss of Communication DTC's Front Right Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is True b) All of the following are met: i) Front Right Temp Actuator Performance Diagnostic Allowable Stalled Movement Range is equal to Normal "ii) Front Right Temp Actuator Actual position > "iii) Front Right Temp Actuator Actual position <	= TRUE U065A B2B2D =TRUE =Normal > Front Right Temp Actuator Performance Diagnostic Future Position Desired MINUS 5,000.00 < Front Right Temp Actuator Performance Diagnostic Future Position Desired PLUS 5,000.00	Up to 4.80 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					iV) Front Right Temp Actuator Learn Retry Count (counter has not expired)	< 3		
			Failure Case 2: All of the conditions are met: Front Right Temp Actuator Learn Retry Count Front Right Temp Actuator Performance Diagnostic Stall Detected	 > 3 = End Stop Detected	Diagnostic is Enabled Front Right Temp Actuator Diagnostics Global enable Calibration is TRUE No Active Loss of Communication DTC's Front Right Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is True b) All of the following are met: i) Front Right Temp Actuator Performance Diagnostic Allowable Stalled Movement Range is equal to Normal "ii) Front Right Temp Actuator Actual position >	 = TRUE U065A B2B2D =TRUE =Normal > Front Right Temp Actuator Performance Diagnostic Future Position Desired MINUS 5,000.00	Up to 4.80 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					"iii) Front Right Temp Actuator Actual position < iV) Front Right Temp Actuator Learn Retry Count (counter has not expired)	< Front Right Temp Actuator Performance Diagnostic Future Position Desired PLUS 5,000.00 < 3		
			Failure Case 3: All of the conditions are met: Front Right Temp Actuator Future Position Performance Fail Timer Any of the conditions below are satisfied: a) Front Right Temp Actuator Actual Position b) Front Right Temp Actuator Actual Position	> 120.00 s < Front Right Temp Actuator Future Position Commanded - 5,000 steps > Front Right Temp Actuator Future Position Commanded+ 5,000 steps	Diagnostic is Enabled Front Right Temp Actuator Diagnostics Global enable Calibration is TRUE No Active Loss of Communication DTC's Front Right Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is True b) All of the following are met: i) Front Right Temp Actuator Performance Diagnostic Allowable Stalled Movement Range is equal to Normal "ii) Front Right Temp	= TRUE U065A B2B2D =TRUE =Normal	120.00 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Actuator Actual position >	> Front Right Temp Actuator Performance Diagnostic Future Position Desired MINUS 5,000.00		
					"iii) Front Right Temp Actuator Actual position <	< Front Right Temp Actuator Performance Diagnostic Future Position Desired PLUS 5,000.00		
					iV) Front Right Temp Actuator Learn Retry Count (counter has not expired)	< 3		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Return Feedback Circuit Out of Range High	B2B0B	This DTC will detect when the blower motor feedback sensor is reporting a value above the maximum allowed. Blower Motor Speed Feedback Circuit Out of Range High Diagnostic will consume the Climate Control Front Blower Fan Speed Feedback Frequency from the OBD Smart Device "BCM" and increment the failure counter when a fail occurs. X of Y will determine fault maturation and when to set the DTC.	Front Blower Feedback frequency	> 250.00 Hz	All of the following conditions are met: Front Blower Speed Diagnostic Enabled calibration is **TRUE** Front Blower Feedback Check Out of Range High Diagnostic Enabled calibration is **TRUE** Controller is awake No Active DTC Commanded Front Blower Speed Duty Cycle	 = TRUE = TRUE = TRUE B2B02,B2B03 >10.0%	8.00 seconds out of a 10.00 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Return Feedback Circuit Out of Range Low	B2B0C	This DTC will detect when the blower motor feedback sensor is reporting a value less than the minimum allowed. X out of Y will determine fault maturation and when to set the DTC.	Front Blower Feedback DC frequency	< 45.00 Hz	All of the following conditions are met:		8.00 seconds out of a 10.00 seconds window	Type B, 2 Trips
					Front Blower Speed Diagnostic Enabled calibration is **TRUE**	= TRUE		
					Front Blower Feedback Check Out of Range Low Diagnostic Enabled calibration is **TRUE**	= TRUE		
					Controller is awake	= TRUE		
					No Active DTC	B2B02,B2B03		
					Commanded Front Blower Speed Duty Cycle	> 10.0%		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate INFO Touchscreen CSM Performance Rationality (For CSS Engine)	B2B16	This DTC will detect when the Alive Rolling Count and/or Check Sum fails for the CAN Messages containing HVAC OBD required signals from the Touchscreen/CSM. The DTC is enabled when the enable criteria is met, and this DTC is a X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. If the Alive Rolling Count and/or Check Sum fails for any of the above-mentioned signals are set then the BCM shall set the fault status to set to Fail. That status value will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold, then a FAIL is reported. Refer to Section N for Emissions Neutral Default Action	Any of the following conditions are met: a) Multiple HVAC HMI requests provided by Touchscreen/CSM received in a single serial data frame b) HVAC HMI requests provided by Touchscreen/CSM received during Off Power Mode c) Active Alive Rolling Count DTC	**U0485**	Diagnostics is Enabled ECU Initialization No Active Communication DTC	>= 0.25 sec **U0184**		Type C, No SVS "Emissions Neutral Diagnostics - Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Left Front Temp Actuator Out of Range High Diagnostic	B2B28	This DTC will detect when the Temp Door actuator travels its full dynamic range and will fail if a Stall Detected signal from the LIN smart actuator is not received before a calibrated timer has expired or exceeds expected full dynamic range plus calibrated tolerance. This DTC is enabled when the enable criteria of this diagnostics is met and it is an X of Y diagnostic. This DTC runs during actuator Learn initiated by HVAC actuator Controls algorithm. The actuator Learn is a process where the actuator is commanded to perform its full dynamic range check. Actuator Learn primarily occurs during OFF Power Mode after a calibrated timer is expired.	**Fail Case 1:** The failure condition latch is set to True when all the following failure conditions are met for at least one execution: Front Left Temp Actuator Actual position is less than Front Left Temp Actuator Actual position Front Left Temp Actuator Stop Movement Commanded Front Left Temp Actuator High End Stall Timer Front Left Temp Actuator Learn Retry Count Front Left Temp Actuator Expired Retry Timer Front Left Temp Actuator Suspend Learn The failure condition latch will be cleared all the following conditions are met for at least one execution: Failure conditions above are no longer	< Front Left Temp Actuator Future Position Commanded > 12,556 steps = Stop > 0 msec > 3 > 3 = True	Diagnostic is Enabled Front Left Temp Actuator Diagnostics Global enable Calibration is TRUE Front Left Temp Actuator Learn Active signal is TRUE No Active Loss of Communication DTC's No Front Left Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is latched b) All of the following are met: i) Front Left Temp Actuator Stall Timer > msec ii) Front Left Temp Actuator Stop Movement Commanded iii) Front Left Temp Actuator Actual position	= TRUE = TRUE U0659 B2B2A TRUE >0 msec =Stop <= 12,556 steps	Up to 4.80 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			met Front Left Temp Actuator Suspend Learn	 = False	iv) Front Left Temp Actuator Actual Position	>= 11,556 steps		
			Fail Case 2: The failure condition latch is set to True when all the following failure conditions are met for at least one execution: Front Left Temp Actuator Low End Stall Timer Front Left Temp Actuator Stall Detected Front Left Temp Actuator Suspend Learn The failure condition latch will be cleared all the following conditions are met for at least one execution: Failure conditions above are no longer met Front Left Temp Actuator Suspend Learn	 = 0 msec = No End Stop Detected = True = False	Diagnostic is Enabled Front Left Temp Actuator Diagnostics Global enable Calibration Front Left Temp Actuator Learn Active signal No Active Loss of Communication DTC's Front Left Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is latched b) All of the following are met: i) Front Left Temp Actuator Stall Timer > msec ii) Front Left Temp Actuator Stop Movement Commanded	 = TRUE = TRUE U0659 B2B2A =TRUE >0 msec =Stop	Up to 20.00 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					iii) Front Left Temp Actuator Actual position	<= 12,556 steps		
					iv) Front Left Temp Actuator Actual Position	>= 11,556 steps		
			Fail Case 3:		Diagnostic is Enabled		Up to 80.00 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	
			The failure condition latch is set to True when all the following failure conditions are met for at least one execution:All of the conditions are met:		Front Left Temp Actuator Diagnostics Global enable Calibration is TRUE	= TRUE		
					Front Left Temp Actuator Learn Active signal is TRUE	= TRUE		
			Front Left Temp Actuator High End Stall Timer	= 0 msec	No Active Loss of Communication DTC's	U0659		
			Front Left Temp Actuator Learn Retry Count	> 3	Front Left Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active	B2B2A		
			Front Left Temp Actuator Stall Detected	= No End Stop Detected				
			Front Left Temp Actuator Suspend Learn	= True	Only one of the following condition (a) or (b) is met:			
			The failure condition latch will be cleared all the following conditions are met for at least one execution:		a) Diagnostic failure is latched	=TRUE		
					b) All of the following are met:			
			Failure conditions above are no longer met		i) Front Left Temp Actuator Stall Timer > msec	>0 msec		
					ii) Front Left Temp			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Front Left Temp Actuator Suspend Learn	= False	Actuator Stop Movement Commanded iii) Front Left Temp Actuator Actual position iv) Front Left Temp Actuator Actual Position	=Stop <= 12,556 steps >= 11,556 steps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Left Front Temp Actuator Out of Range Low Diagnostic	B2B29	This DTC will detect when the Temp Door is commanded to move to the higher end of its dynamic range and fails to reach the end of the commanded position short of a calibrated tolerance. This DTC is enabled when the enable criteria of this diagnostics is met and it is an X of Y diagnostic. This DTC runs during Actuator Learn initiated by HVAC Actuator Controls algorithm. The Actuator Learn is a process where the actuator is commanded to perform its full dynamic range check. Actuator Learn primarily occurs during OFF Power Mode after a calibrated timer is expired. After the actuator is commanded to the lower end of its dynamic range and the BCM has received End Stop Detected from the LIN smart actuator and the calibrated timer is not expired then the actuator is commanded to the high end of its dynamic range.	**Failure Case 1:** The failure condition latch is set to True when all the following failure conditions are met for at least one execution: Front Left Temp Actuator Actual position Front Left Temp Actuator Actual position Front Left Temp Actuator Stop Movement Commanded Front Left Temp Actuator High End Stall Timer Front Left Temp Actuator Learn Retry Count Front Left Temp Actuator Expired Retry Timer Front Left Temp Actuator Suspend Learn The failure condition latch will be cleared when all the following conditions are met for at least one execution: Failure conditions	< 11,556 steps < Front Left Temp Actuator Future Position Commanded = Stop > 0 msec > 3 > 3 = True	Diagnostic is Enabled The diagnostic is enabled when all of the foilwing conditions are met: Front Left Temp Actuator Diagnostics Global enable Calibration is TRUE Front Left Temp Actuator Learn Active signal No Active Loss of Communication DTC's No Front Left Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is latched b) All of the following are met: i) Front Left Temp Actuator Stall Timer > msec ii) Front Left Temp Actuator Stop Movement Commanded iii) Front Left Temp	= TRUE = TRUE U0659 B2B2A TRUE >0 msec =Stop	Up to 4.80 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			above are no longer met. Front Left Temp Actuator Suspend Learn	=False	Actuator Actual position iv) Front Left Temp Actuator Actual Position	<= 12,556 steps >= 11,556 steps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Left Front Temperature Data Message Counter Incorrect	B2B2A	This DTC monitors for an internal error or error in communication with the Left Front Temperature Actuator	Any of the Alive Rolling Counts signal values listed below are incorrect for: AHDA02_ARC:	8 fail counts out of 10 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	LIN bus communication executes in 600ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Right Front Temp Actuator Out of Range High Diagnostic	B2B2B	This DTC will detect when the Temp Door actuator travels its full dynamic range and will fail if a Stall Detected signal from the LIN smart actuator is not received before a calibrated timer has expired or exceeds expected full dynamic range plus calibrated tolerance. This DTC is enabled when the enable criteria of this diagnostics is met and it is an X of Y diagnostic. This DTC runs during actuator Learn initiated by HVAC actuator Controls algorithm. The actuator Learn is a process where the actuator is commanded to perform its full dynamic range check. Actuator Learn primarily occurs during OFF Power Mode after a calibrated timer is expired.	**Failure Case 1:** The failure condition latch is set to True when all the following failure conditions are met for at least one execution: Front Right Temp Actuator Actual position is less than Front Right Temp Actuator Actual position Front Right Temp Actuator Stop Movement Commanded Front Right Temp Actuator High End Stall Timer Front Right Temp Actuator Learn Retry Count Front Right Temp Actuator Expired Retry Timer Front Right Temp Actuator Suspend Learn The failure condition latch will be cleared all the following conditions are met for at least one execution: Failure conditions above are no longer met	< Front Right Temp Actuator Future Position Commanded > 12,653 steps = Stop > 0 msec > 3 > 3 = True	Diagnostic is Enabled Front Right Temp Actuator Diagnostics Global enable Calibration is TRUE Front Right Temp Actuator Learn Active signal is TRUE No Active Loss of Communication DTC's Front Right Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is latched b) All of the following are met: i) Front Right Temp Actuator Stall Timer > msec ii) Front Right Temp Actuator Stop Movement Commanded iii) Front Right Temp Actuator Actual position iv) Front Right Temp Actuator Actual	= TRUE = TRUE U065A B2B2D =TRUE >0 msec =Stop <= 12,653 steps	Up to 4.80 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Front Right Temp Actuator Suspend Learn	= False	Position	>=11,653.00 steps		
			Failure Case 2: The failure condition latch is set to True when all the following failure conditions are met for at least one executiomAll of the conditions are met: Front Right Temp Actuator Low End Stall Timer Front Right Temp Actuator Stall Detected Front Right Temp Actuator Suspend Learn The failure condition latch will be cleared all the following conditions are met for at least one execution: Failure conditions above are no longer met Front Right Temp Actuator Suspend Learn	= 0 msec = No End Stop Detected = True = False	Diagnostic is Enabled Front Right Temp Actuator Diagnostics Global enable Calibration is TRUE Front Right Temp Actuator Learn Active signal is TRUE No Active Loss of Communication DTC's Front Right Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is latched b) All of the following are met: i) Front Right Temp Actuator Stall Timer > msec ii) Front Right Temp Actuator Stop Movement Commanded iii) Front Right Temp	= TRUE = TRUE U065A B2B2D =TRUE >0 msec =Stop	Up to 20.00 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Actuator Actual position iv) Front Right Temp Actuator Actual Position	<= 12,653 steps >=11,653.00 steps		
			Failure Case 3: The failure condition latch is set to True when all the following failure conditions are met for at least one execution:All of the conditions are met:All of the conditions are met: Front Right Temp Actuator High End Stall Timer Front Right Temp Actuator Learn Retry Count Front Right Temp Actuator Stall Detected Front Right Temp Actuator Suspend Learn The failure condition latch will be cleared all the following conditions are met for at least one execution: Failure conditions above are no longer met	= 0 msec > 3 = No End Stop Detected = True	Diagnostic is Enabled Front Right Temp Actuator Diagnostics Global enable Calibration is TRUE Front Right Temp Actuator Learn Active signal is TRUE No Active Loss of Communication DTC's Front Right Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is latched b) All of the following are met: i) Front Right Temp Actuator Stall Timer > msec ii) Front Right Temp Actuator Stop Movement Commanded	= TRUE = TRUE U065A B2B2D =TRUE >0 msec =Stop	Up to 80.00 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Front Right Temp Actuator Suspend Learn	= False	iii) Front Right Temp Actuator Actual position iv) Front Right Temp Actuator Actual Position	<= 12,653 steps >=11,653.00 steps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Right Front Temp Actuator Out of Range Low Diagnostic	B2B2C	This DTC will detect when the Temp Door is commanded to move to the higher end of its dynamic range and fails to reach the end of the commanded position short of a calibrated tolerance. This DTC is enabled when the enable criteria of this diagnostics is met and it is an X of Y diagnostic. This DTC runs during Actuator Learn initiated by HVAC Actuator Controls algorithm. The Actuator Learn is a process where the actuator is commanded to perform its full dynamic range check. Actuator Learn primarily occurs during OFF Power Mode after a calibrated timer is expired. After the actuator is commanded to the lower end of its dynamic range and the BCM has received End Stop Detected from the LIN smart actuator and the calibrated timer is not expired then the actuator is commanded to the high end of its dynamic range.	**Failure Case 1:** The failure condition latch is set to True when all the following failure conditions are met for at least one execution:All of the conditions are met: Front Right Temp Actuator Actual position Front Right Temp Actuator Actual position Front Right Temp Actuator Stop Movement Commanded Front Right Temp Actuator High End Stall Timer Front Right Temp Actuator Learn Retry Count Front Right Temp Actuator Expired Retry Timer Front Right Temp Actuator Suspend Learn The failure condition latch will be cleared when all the following conditions are met for at least one execution: Failure conditions above are no longer met.	= 11,653 steps < Front Right Temp Actuator Future Position Commanded = Stop > 0 msec > 3 > 3 = True	Diagnostic is Enabled Front Right Temp Actuator Diagnostics Global enable Calibration is TRUE Front Right Temp Actuator Learn Active signal is TRUE No Active Loss of Communication DTC's Front Right Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active Only one of the following condition (a) or (b) is met: a) Diagnostic failure is latched b) All of the following are met: i) Front Right Temp Actuator Stall Timer > msec ii) Front Right Temp Actuator Stop Movement Commanded iii) Front Right Temp Actuator Actual position iv) Front Right Temp	= TRUE = TRUE U065A B2B2D =TRUE >0 msec =Stop <= 12,653 steps >=11,653.00 steps	Up to 4.80 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Front Right Temp Actuator Suspend Learn	=False	Actuator Actual Position			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Right Front Temperature Data Message Counter Incorrect	B2B2D	This DTC monitors for an internal error or error in communication with the Right Front Temperature Actuator	Any of the Alive Rolling Counts signal values listed below are incorrect for: AHDA03_ARC:	8 fail counts out of 10 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	LIN bus communication executes in 600ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 4 Left Circuit High	B2B95	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range High (4) is Front Faceplate Temperature Continuous DECECU Front Right High Delta X (4) is Front Faceplate Temperature Continuous DECECU Front Right Failure Ratio (4) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 4 Left Circuit Low	B2B96	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range Low (4) is Front Faceplate Temperature Continuous DECECU Front Right Low Delta X (4) is Front Faceplate Temperature Continuous DECECU Front Failure Ratio (4) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 4 Right Circuit High	B2B98	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range High (OORH). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORH status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is greater than or equal to the OORH threshold, the FFP will send the OORH status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range High (4) is Front Faceplate Temperature Continuous DECECU Front Right High Delta X (4) is Front Faceplate Temperature Continuous DECECU Front Right Failure Ratio (4) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Temperature Control Front 4 Right Circuit Low	B2B99	This DTC will detect when the sensed voltage of HVAC FFP Temperature Continuous Knob is Out of Range Low (OORL). The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the HVAC FFP Temperature Continuous Knob raw voltage signals for circuits 1 thru 4 as well as the OORL status signals to the BCM. The FFP also sends the accumulated fail and sample counts to the BCM for fault maturation. This DTC is a modified X out of Y diagnostic. The diagnostic will run continuously if serial data is operating. When the voltage is less than or equal to the OORL threshold, the FFP will send the OORL status signal, the accumulated fail and sample counts, as well as the raw voltage to the BCM. The BCM will use these signals in determining the maturation of the diagnostic to a PASS or	Front Faceplate Request Temperature Level Front Right Out of Range Low (4) is Front Faceplate Temperature Continuous DECECU Front Right Low Delta X (4) is Front Faceplate Temperature Continuous DECECU Front Right Failure Ratio (4) is AND	= TRUE >=400.00 >=0.40 <= 1	Diagnostics is Enabled No Active Communication DTC	**U0164, U0424**	20 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		FAIL status. When the accumulated FAIL counts exceed the calibrated failure threshold within the calibrated sample threshold, then a FAIL is reported.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Air Conditioning (A/C) Evaporator Temperature Sensor Circuit	P0535	This DTC will determine whether the rate of change of the evaporator air temperature as sensed by the EAT sensor as read by the BCM has exceeded a calibrated value. The DTC is enabled when the enable criteria is met. This DTC is an X out of Y diagnostic. The diagnostic will run continuously. The fail criteria of the diagnostic shall be met after the following: 1. Take the absolute value of the difference between the current EAT value and previous EAT value. 2. Calculate the calibrated threshold for the EAT sensor rate of change by taking the calibrated value for maximum allowable rate of change for EAT sensor and divide by the number of executions per second. Check that the absolute value of the difference between the current EAT value and previous EAT value exceeds the calibrated threshold for the EAT sensor rate of change. When the fail	The absolute value of the difference between curent Raw Evaporator Air Temperature value and previous Raw Evaporator Air Temperature value is	> 40.00 Changes per Execution (deg C)	Diagnostic is Enabled Evaporator Air Temperature Diagnostics Global Enable Calibration is TRUE Evaporator Air Temperature Sensor Present is TRUE 12 Volt System Voltage in Range Status Electrionic Control Unit (ECU) Wakeup Pass No Active AC_Evaporator Air Temperature (EAT) Out of Range High Fault Active No Active AC_Evaporator Air Temperature (EAT) Out of Range Low Fault Active	 = TRUE = TRUE = TRUE = TRUE P0538 P0537	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		criteria is met, the fault status shall equal FAIL. This will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold in the same fault maturation cycle, the DTC shall set.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Air Conditioning (A/C) Evaporator Temperature Sensor Circuit Low	P0537	This DTC will detect the Evaporator Air Temperature Sensor that is too low and out of the expected operating temperature sensor range. The DTC is enabled when the enable criteria is met. This DTC is an X out of Y diagnostic. The diagnostic will run continuously. When the voltage is less than or equal to Out of range Low threshold then fail criteria shall be met and the fault status shall equal FAIL. This will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold in the same fault maturation cycle, the DTC shall set.	Debouned Raw Evaporator Air Temperature Voltage is	< 0.17 (Volts)	Diagnostic is Enabled Evaporator Air Temperature Diagnostics Global Enable Calibration is TRUE Evaporator Air Temperature Sensor Present is TRUE Electrionic Control Unit (ECU) Wakeup Pass	 = TRUE = TRUE = TRUE	7.92 seconds out of a 9.9 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Air Conditioning (A/C) Evaporator Temperature Sensor Circuit High	P0538	This DTC will detect the Evaporator Air Temperature Sensor that is too high and out of the expected operating temperature sensor range. The DTC is enabled when the enable criteria is met. This DTC is an X out of Y diagnostic. The diagnostic will run continuously. If the voltage is greater than or equal to the Out of range High threshold then fail criteria shall be met and the fault status shall equal FAIL. This will cause the fail counter to increment. When the fail counter reaches its threshold prior to the sample counter reaching its threshold in the same fault maturation cycle, the DTC shall set.	Debouned Raw Evaporator Air Temperature Voltage is	> 4.75 (Volts)	Diagnostic is Enabled Evaporator Air Temperature Diagnostics Global Enable Calibration is TRUE Evaporator Temperature Sensor Present is TRUE Electrionic Control Unit (ECU) Wakeup Pass	 = TRUE = TRUE = TRUE	7.92 seconds out of a 9.9 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Performance	P058A	The battery monitor module performance diagnostic is required to diagnose if the IBS sensor has any internal faults. The IBS checks a list of performance parameters as part of this diagnostic: reference voltage, voltage calibration check, current claibration check, NVM static data checksum, NVM dynamic data checksum, page 0 checksum, and wakeup timer check. Once all checks are completed in IBS the result is transmitted to BCM where appropriate DTC will be reported to DFIR. This diagnostic occurs once upon LIN wakeup, and the result is transmitted to BCM within 6 seconds.	IBS Sensor Internal Fault is TRUE (Internal IBS diagnostic)	= CeEM_e_IBS_DiagFailed	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Monitor Module Performance Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE U01B000 P15FF00	6 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Current Monitoring Performance	P058B	The Battery Monitor Module Current Performance diagnostic is required to ensure there is not an open circuit fault at the shunt resistor. This diagnostic is performed within IBS and status is communicated to BCM where results are reported to DFIR. . IBS monitors the shunt resistor for open circuit while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 4 fails out of 5 samples at a rate of 16 second per sample.	IBS has open shunt condition, Battery Current Rationality Diagnostic Determination equals Diagnostic Failed (Internal IBS diagnostic)	= CeEM_e_IBS_DiagFailed	All of the following conditoins are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** IBS Current Performance Diagnostic Enable is **TRUE** IBS Current Performance Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Battery Current Rationality Historical Diagnostic Enable is **FALSE**	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B00 = P15FF00 = FALSE	80 seconds (4 fails out of 5 samples at 16 seconds per sample)	Type B, 2 Trips
			IBS has open shunt condition: Battery Current Rationality Diagnostic Determination equals Diagnostic Failed	= CeEM_e_IBS_DiagFail	All of the following conditions are met: System 12V Battery Voltage is above threshold	>11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(Internal IBS diagnostic)	ed		hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					IBS Current Performance Diagnostic Enable is **TRUE**	= TRUE		
					IBS Current Performance Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Temperature Monitoring Performance	P058C	The battery monitor module temperature monitoring performance is required to diagnose if the difference between IBS NTC raw temperature and IBS ASIC raw temperature is within a rational threshold. This diagnostic is performed in BCM by comparing the difference between NTC and ASIC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 set of sample per 30min while LIN is off. These 24 sets of samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Absolute difference between ASIC Raw Temperature and NTC Raw Temperature is above threshold	> 10.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range IBS Temperature Performance Diagnostic Enable is **TRUE** IBS Temperature Performance Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC No Active IBS Temperature Out of Range DTCs	>11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00 = P058E00, P058F00, P16DE00, P16DF00	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Absolute difference between ASIC Raw Temperature and NTC Raw Temperature is above threshold	> 10.00 degrees Celsius	All of the following conditions are met:		8 seconds out of a 10 seconds window	
					System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is within range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					IBS Temperature Performance Diagnostic Enable is **TRUE**	= TRUE		
					IBS Temperature Performance Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Historical Temperature Data Down Count is in range	> 0 AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						<= 24		
					No Active IBS Temperature Out of Range DTCs	= P058E00, P058F00, P16DE00, P16DF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Voltage Monitoring Performance	P058D	The Battery Monitor Module Voltage Performance diagnostic is required to diagnose if the IBS Battery Voltage Sensor is accurately sensing the 12V Battery Voltage. The IBS battery voltage high resolution will be transmitted via LIN message from the sensor indicating what its internal sensor is reading for voltage. This voltage is compared with BCM's internal voltage reading (12V System Voltage). If the difference between the two voltages is greater than a calibratable threshold, then the fail counter will increment. Due to the high fluctuation of voltage during cranking event, this diagnostic is disabled from beginning of crank to a calibratable time delay after the end of crank. This diagnostic uses an X of Y strategy.	Absolute difference between Battery Monitor Module Voltage and BCM System Voltage is above threshold	>5.00 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Monitor Module Voltage Performance Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC No Active Battery Voltage Out of Range DTCs Powertrain Crank Active is **FALSE** Post-Crank Time Delay has elapsed	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = U01B000 = P15FF00 = P16D400, P16D500 = FALSE >5,000.00 seconds	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Temperature High	P058E	The Battery Monitor Module Temperature Out of Range High diagnostic is required to diagnose if the IBS ASIC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw ASIC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Battery Monitor Module ASIC Temperature above threshold	> 120.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range IBS Temperature High Diagnostic Enable is **TRUE** IBS Temperature High Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00	4 seconds out of a 5 seconds window	Type B, 2 Trips
			Battery Monitor Module ASIC Temperature above threshold	> 120.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable <	4 seconds out of a 5 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is in range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					IBS Temperature High Diagnostic Enable is **TRUE**	= TRUE		
					IBS Temperature High Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Historical Temperature Data Down Count is in range	> 0 AND <= 24		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Temperature Low	P058F	The Battery Monitor Module Temperature Out of Range Low diagnostic is required to diagnose if the IBS ASIC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw ASIC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Battery Monitor Module ASIC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range IBS Temperature Low Diagnostic Enable is **TRUE** IBS Temperature Low Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00	4 seconds out of a 5 seconds window	Type B, 2 Trips
			Battery Monitor Module ASIC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable <	4 seconds out of a 5 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is in range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					IBS Temperature Low Diagnostic Enable is **TRUE**	= TRUE		
					IBS Temperature Low Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Historical Temperature Data Down Count is in range	> 0 AND <= 24		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Driver Mode Select Switch A Circuit Low	P05D1	This DTC will detect an OBD-compliant analog switch bank 1 inputthat is too low (out-of-range low).	Analog Mode Switch low voltage threshold	< 0.5280 V	VehicleSwitchBankl Diagnostic Enable calibration is **TRUE** VehicleSwitchBankl Circuit Diagnostic Enable calibration is **TRUE** VehicleSwitchBankl Circuit Out-Of-Range Low Diagnostic Enable calibration is **TRUE**	= TRUE = TRUE = TRUE	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Driver Mode Select Switch A Circuit High	P05D2	This DTC will detect an OBD-compliant analog switch bank 1 inputthat is too high (out-of-range high).	Analog Mode Switch high voltage threshold	> 4.7220 V	VehicleSwitchBankl Diagnostic Enable calibration is **TRUE** VehicleSwitchBankl Circuit Diagnostic Enable calibration is **TRUE** VehicleSwitchBankl Circuit Out-Of-Range High Diagnostic Enable calibration is **TRUE**	= TRUE = TRUE = TRUE	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Driver Mode Select Switch A Range/ Performance	P05D3	This DTC will detect an OBD-compliant analog switch bank 1 inputthat is invalid within its performance range (in-range deadband).	Analog Mode Switch indeterminate (deadband) regions for 8-state analog resistor ladder	0.5280 < sensed voltage < 0.6280 1.0270 < sensed voltage < 1.1030 1.5220 < sensed voltage < 1.5980 2.0350 < sensed voltage <2.11 2.57 < sensed voltage < 2.64 3.10< sensed voltage <3.18 3.61< sensed voltage < 3.69 4.13 < sensed voltage < 4.20 4.62 < sensed voltage < 4.72	VehicleSwitchBankl Diagnostic Enable calibration is TRUE VehicleSwitchBankl Circuit Diagnostic Enable calibration is TRUE VehicleSwitchBankl Circuit Performance Diagnostic Enable calibration is TRUE	= TRUE = TRUE = TRUE	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration/ software checksum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type B, 2 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code	ROM ECC diagnostic enable is **CbTRUE**	= CbTRUE	Diagnostic runs continuously via the flash hardware.	
				In all cases, the failure count is cleared when controller shuts down				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Long Term Memory Reset	P0603	This DTC detects an invalid NVM which includes Static NVM, Cumuliteve NVM, and SSAR NVM invalidities at start up.	Static NVM region error detected during initialization		Static NVM fault on default diagnostic enable is **CbTRUE** Allow blank BINVDN must be **CbFALSE**	= CbTRUE = CbFALSE	Diagnostic runs at controller power up.	Type B, 2 Trips
			Cumulative NVM region error detected during initialization		Cumulative NVM fault on default diagnostic enable is **CbTRUE** Allow blank BINVDN must be **CbFALSE**	= CbTRUE = CbFALSE	Diagnostic runs at controller power up.	
			SSAR NVM region error detected during initialization.		SSAR NVM fault on default diagnostic enable is **CbTRUE** Allow blank BINVDN must be **CbFALSE**	= CbTRUE = CbFALSE	Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module RAM Failure	P0604	Indicates that the control module has detected a RAM fault. This includes read/ write failures such as a Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, and Primary Processor eTPU RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written	>= 254 counts			Fault indication fed from HWIO- diagnostic runs continuously (background loop)	Type B, 2 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written	>= 254 counts			Fault indication fed from HWIO- diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written	>= 3 counts			Fault indication fed from HWIO - diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Processor Integrity Fault	P0606	Indicates that the control module has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for the primary processor.	2 fails in a row in the MAIN processor's ALU check		ALU diagnostic enable per CPU is **CbTRUE**	= CbTRUE	Run periodically at 25 ms loop rate	Type B, 2 Trips
			Checks number of stack over/under flow since last powerup reset	>= 5	Stack Llimit Test diagnostic enable is **CbTRUE**	= CbTRUE	Run periodically at 100ms loop rate	
			Voltage deviation	> 0.4500 V	ADC Test diagnostic enable is **CbTRUE** A2D Test voltages used in diagnosis: **Test Voltage 1** **Test Voltage 2** **Test Voltage 3** **Test Voltage 4** Arbitrated Battery Voltage	= CbTRUE = 0 = 0 = 1 = 1 (1 means enabled, 0 means disabled) > 7.00 V	16 / 20 counts or 0.819 seconds continuous - Note: 50 ms/ count	
			MAIN processor DMA transfer test failures:	16/20 counts	DMA Transfer Test diagnostic enable is **CbTRUE**	= CbFALSE	Run periodically at 50ms loop rate	
			Safety critical software is not executed in proper order. End task calculation does not match expected value for failures	>= 1 incorrect sequence	Program Sequence Watch diagnostic enable calibration per task rate is **CbTRUE** **5ms** **10ms** **25ms** **50ms** **100ms**	 = CbTRUE = CbTRUE = CbTRUE = CbTRUE = CbTRUE	Fail time interval determined per task rate: 5ms: 12/16 counts 10ms: 12/16 counts 25ms: 12/16 counts 50ms: 6/8 counts	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							100ms: 3 / 4 counts Note: 50 ms/ count	
			MAIN processor determines a Program Sequence Watch seed has not changed within a specified time period.	Current seed value equals previous seed value.	Last Seed Timeout diagnostic enable is **CbTRUE**	= CbTRUE	Fail tolerant time set per task rate enabled through the Program Sequence Watch function: 5ms: 822 ms 10ms: 822 ms 25ms: 822 ms 50ms: 822 ms 100ms: 1,000 ms Note: 50 ms monitoring task rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Processor Integrity Performance	P0607	Indicates that the ECM has detected an internal processor integrity performance.	Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter	>= 3/10 (results in MIL) or >=5/10 (results in MIL and remedial action)	Flash ECC diagnostic enable is **CbTRUE**	= CbTRUE	Fail indication from HWIO, variable failure dependent on time to access corrupt flash memory	Type B, 2 Trips
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter	>= 3 (results in MIL) / 10 5 (results in MIL and remedial action) / 10	RAM ECC diagnostic enable is **CbTRUE**	= CbTRUE	Fail indication from HWIO, variable failure dependent on time to access corrupt RAM variables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up, evaluation of NVM write at shutdown.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough.	BCM percent Vref3 < or BCM percent Vref3 > or the difference between BCM filtered percent Vref3 and percent Vref3 >	78.13% Vref3 89.96 % Vref3 7.0000 % Vref3	Diagnostic enabled	= CbTRUE	0.8 seconds out of a 1 seconds window or 200.00 sec continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Temperature Erratic	P100C	The Battery Monitor Module Temperature Erratic diagnostic is required to diagnose if the IBS ASIC Raw Temperature sensor is erratic, caused by sudden short to ground or short to high. This diagnostic is performed in BCM by adding the absolute raw ASIC temperature values sent by IBS over a period of time and comparing with a calibratable threshold. This diagnostic uses the X of Y strategy.	Sum of the absolute difference between 10.00 ASIC Raw Temperature samples is above threshold	>70.00 degrees Celsius	All of the following conditions are met:		40 seconds out of a 50 seconds window	Type B, 2 Trips
					System 12V Battery Voltage is above threshold	>11.00 volts (with hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is within range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					Temperature Erratic Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Internal Temperature Erratic	P100D	The Battery Monitor Module Internal Temperature Erratic diagnostic is required to diagnose if the IBS NTC Raw Temperature sensor is erratic, caused by sudden short to ground or short to high. This diagnostic is performed in BCM by adding the absolute raw NTC temperature values sent by IBS over a period of time and comparing with a calibratable threshold. This diagnostic uses the X of Y strategy.	Sum of the absolute difference between 10.00 NTC Raw Temperature samples is above threshold	>70.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range Temperature Circuit Erratic Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = U01B000 = P15FF00	40 seconds out of a 50 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Air Conditioning (A/C) Evaporator Temperature Sensor Not Plausible - Sensor Rationality	P153B	This DTC will compare EAT (Evaporator Air Temperature) with IAT (Inlet Air Temperature) and OAT (Outside Air Temperature) after a long soak The DTC is enabled when the enable criteria is met. This diagnostic will run once per drive cycle. The fail criteria of the diagnostic shall be met after All the following are true: • The difference between the absolute value of the Evaporator Air Temperature and Inlet Air Temperature sensor values exceeds a calibrated value. • The difference between the absolute value of the Evaporator Air Temperature and Outside Air Temperature sensors values exceeds the calibrated value. When the fail criteria is met during the 1st increment, the fault status shall equal FAIL. This will cause the DTC to set.	If the absolute value of the differences between Raw Evaporator Air Temperature and the Inlet Air Temperature Sensor Value is If the absolute value of the differences between Raw Evaporator Air Temperature and the Outside Air Temperature Sensor Value is	> 20.00 (degC) > 15.00 (degC)	Diagnostic is Enabled Evaporator Air Temperature Diagnostics Global Enable Calibration is TRUE Evaporator Temperature Sensor Present Electrionic Control Unit (ECU) Wakeup Pass OBD Bias Check Enable Loss of Communiation of Propullsion System Off Time Invalidity Indication of Propulsion System Off Time Do Not Use Data Mas of Propulsion System Off Time Invalidity Indications of Inlet Air Temperature Sensor Value Status Indication of Inlet Air Temperature Sensor Value Loss of Communiatcation Outside Air Temperature Sensor Diagnosti Bundle Fault Active Outside Air Temperature	= TRUE = TRUE = TRUE = TRUE = FALSE = VALID = FALSE = VALID = FALSE = FALSE	Diagnostic runs in 0.050 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Rationalized State Value of Propulsion System Off Timer is No Active AC_Evaporator Air Temperature (EAT) Out of Range High Fault Active No Active AC_Evaporator Air Temperature (EAT) Out of Range Low Fault Active No Active AC_Evaporator Air Temperature (EAT) Circuit Fault Active	= NORMAL > 28,800.00 (Seconds) P0538 P0537 P0535		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Sensor Signal Message Counter Incorrect	P15FF	This DTC monitors for an internal error or error in communication with the Battery Monitor Signal	Any of the Alive Rolling Counts signal values listed below are incorrect for: AmpHrsChrgdARC: AmpHrsDischrgdARC: BatCrnkDatARC: BatLINOffDatARC: BatStsDatARC: CfgWkupDatARC: IBSCurrOORAndRatIFOMARC: IBSDiagDetARC: MsrdTempARC: MinCrnkgDatARC: MVIAndSOFDatARC: BatSOCDatARC:	8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	Fastest periodic communication rate to Battery Monitor Module on LIN bus executes at 250ms.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			IBSVltgFOMARC:	8 fail counts out of 10 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Circuit Voltage Low	P16D4	The Battery Monitor Module Circuit Low Voltage diagnostic is performed within intelligent battery sensor and is required to diagnose if the Sensor Voltage is out of range low. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery voltage while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds.	Battery Monitor Module Circuit Voltage below threshold (Internal IBS Diagnostic)	< 3 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Voltage Out of Range Low Diagnostic Enable is **TRUE** Battery Voltage Out of Range Low Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Battery Voltage Out of Range Low Historical Diagnostic Enable is **FALSE**	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B000 = P15FF00 = FALSE	0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
			Battery Monitor Module Circuit Voltage below threshold (Internal IBS Diagnostic)	< 3 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold	>11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Battery Voltage Out of Range Low Diagnostic Enable is **TRUE**	= TRUE		
					Battery Voltage Out of Range Low Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Circuit Voltage High	P16D5	The Battery Monitor Module Circuit High Voltage diagnostic is performed within intelligent battery sensor and is required to diagnose if the Sensor Voltage is out of range high. Once diagnostics determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery voltage while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds.	Battery Monitor Module Circuit Voltage above threshold (Internal IBS Diagnostic)	> 26 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Voltage Out of Range High Diagnostic Enable is **TRUE** Battery Voltage Out of Range High Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Battery Voltage Out of Range High Historical Diagnostic Enable is **FALSE**	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B000 = P15FF00 = FALSE	0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
			Battery Monitor Module Circuit Voltage above threshold (Internal IBS Diagnostic)	> 26 Volts	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Battery Voltage Out of Range High Diagnostic Enable is **TRUE**	= TRUE		
					Battery Voltage Out of Range High Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Current Low	P16D6	The Battery Monitor Module Current Out of Range Low diagnostic is performed within intelligent battery sensor and is required to diagnose if the sensor current is out of range low. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery current while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds.	Battery Monitor Module Current below threshold (Internal IBS diagnostic)	< -1400 Amps	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** IBS Current Out of Range Low Diagnostic Enable is **TRUE** IBS Current Out of Range Low Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Shunt Voltage Out of Range Low Historical Diagnostic Enable is **FALSE**	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B000 = P15FF00 = FALSE	0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
			Battery Monitor Module Current below threshold (Internal IBS diagnostic)	< -1400 Amps	All of the following conditions are met: System 12V Battery Voltage is above threshold	>11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					IBS Current Out of Range Low Diagnostic Enable is **TRUE**	= TRUE		
					IBS Current Out of Range Low Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Current High	P16DD	The Battery Monitor Module Current Out of Range High diagnostic is performed within intelligent battery sensor and is required to diagnose if the sensor current is out of range high. Once diagnostic determination is reached in IBS, the status is communicated to BCM where results are reported to DIFR. IBS monitors the battery current while asleep and record historical result. This result is sent to BCM upon LIN wakeup. The BCM receives the historical result and reports to DIFR within 1 second of LIN wakeup. The continuous portion of this diagnostic does not run while the historical portion is running. The internal IBS diagnostic for the continuous portion uses 200 fails out of 250 samples at a rate of 0.001 second per sample. The diagnostic result is sent to BCM continuously once per 0.25 seconds.	Battery Monitor Module Current above threshold (Internal IBS diagnostic)	> 1400 Amps	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** IBS Current Out of Range High Diagnostic Enable is **TRUE** IBS Current Out of Range High Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Shunt Voltage Out of Range High Historical Diagnostic Enable is **FALSE**	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = TRUE = U01B000 = P15FF00 = FALSE	0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	Type B, 2 Trips
			Battery Monitor Module Current above threshold (Internal IBS diagnostic)	> 1400 Amps	All of the following conditions are met: System 12V Battery Voltage is above threshold	> 11.00 volts (with	1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					IBS Current Out of Range High Diagnostic Enable is **TRUE**	= TRUE		
					IBS Current Out of Range High Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Internal Temperature Circuit Low	P16DE	The Battery Monitor Module Internal Temperature Out of Range High diagnostic is required to diagnose if the IBS NTC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw NTC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Battery Monitor Module NTC Temperature above threshold	> 120.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range Temperature Circuit Low Diagnostic Enable is **TRUE** Temperature Circuit Low Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00	4 seconds out of a 5 seconds window	Type B, 2 Trips
			Battery Monitor Module NTC Temperature above threshold	> 120.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold	>11.00 volts (with	4 seconds out of a 5 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is in range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					Temperature Circuit Low Diagnostic Enable is **TRUE**	= TRUE		
					Temperature Circuit Low Historical Diagnostic Enable is **TRUE**	= TRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
					Historical Temperature Data Down Count is in range	> 0 AND <= 24		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Internal Temperature Circuit High	P16DF	The Battery Monitor Module Internal Temperature Out of Range High diagnostic is required to diagnose if the IBS NTC Raw Temperature is above selected threshold value. This diagnostic is performed in BCM by comparing raw NTC temperature values sent by IBS with a calibratable threshold. IBS records up to 24 temperature samples at a rate of 1 sample per 30min while LIN is off. These 24 samples are used in historical diagnostic, which occurs immediately after LIN wakeup. The historical diagnostic only runs once per LIN wakeup, while the continuous diagnostic runs repeatedly. BCM uses a X of Y strategy for both types of diagnostics.	Battery Monitor Module NTC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range Temperature Circuit High Diagnostic Enable is **TRUE** Temperature Circuit High Continuous Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00	4 seconds out of a 5 seconds window	Type B, 2 Trips
			Battery Monitor Module NTC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met: System 12V Battery Voltage is above		4 seconds out of a 5 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					threshold IBS NormalCommEnable is TRUE Outside Air Temperature is within range Temperature Circuit High Diagnostic Enable is **TRUE** Temperature Circuit High Historical Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC Historical Temperature Data Down Count is in range	>11.00 volts (with hysteresis disable < 10.00) = TRUE > -30.00 degrees Celsius AND < 50.00 degrees Celsius = TRUE = TRUE = U01B000 = P15FF00 > 0 AND <= 24		

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Battery Monitor Module Random Access Memory (RAM) Error	P16E1	The battery Monitor Module performance (RAM) error diagnostic is required to diagnose if the IBS sensor has any internal RAM faults. This diagnostic is performed within IBS and the status is transmitted to BCM where results are reported to DFIR. This diagnostic takes approximately 10 seconds to complete upon LIN wakeup, and is only run once per wakeup. The result is immediately transmitted to BCM after.	IBS Sensor Internal RAM Fault detected: IBS Internal Fault RAM Determination equals **DiagFailed** (internal IBS diagnostic)	 = CeEM_e_IBS_DiagFailed	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS LIN Normal Communication Enable is **TRUE** Battery Monitor Module RAM Error Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = U01B000 = P15FF00	10 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Random Access Memory (ROM) Error	P16E2	The battery Monitor Module performance (ROM) error diagnostic is required to diagnose if the IBS sensor has any internal ROM faults. This diagnostic is performed within IBS and the status is transmitted to BCM where results are reported to DFIR.This diagnostic takes approximately 60 seconds to complete upon LIN wakeup, and is only run once per wakeup. The result is immediately transmitted to BCM after.	IBS Sensor Internal ROM Fault detected: IBS Internal Fault RAM Determination equals **DiagFailed** (internal IBS diagnostic)	 = CeEM_e_IBS_DiagFailed	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Battery Monitor Module ROM Error Diagnostic Enable is **TRUE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	 >11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = U01B000 = P15FF00	60 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Monitor Module Data Incompatible Diagnostic	P16E3	The Battery Monitor Module Data Incompatible diagnostic is required to diagnose if the IBS is using the correct configuration information being transmitted by the Host controller to it. The IBS reads and transmits the configuration values it has loaded internally back to the host controller for verification. The historical test evaluates the IBS configuration return values to check if they are equal to the host controller's values. The diagnostic is executed once per host controller wakeup and checks only the first transmitted LIN message containing the IBS return configuration message. The continuous test compares the IBS configuration return values to those sent by BCM and uses X of Y maturation strategy to determine diagnostic state.	Any of the following criteria are met: IBS Config Return Battery Type is NOT equal to Vehicle Battery Type Configuration Battery Nominal Return C20 is above threshold IBS Config Return Battery Cal #1 U40% is above threshold IBS Config Return Battery Cal #2 U80% is above threshold IfSOC Bounding Limit Configuration check is **TRUE** then following conditions are included SOC Bounding Limit Hr3 Difference is above the threshold SOC Bounding Limit Hr8 Difference is above the threshold SOC Bounding Limit Hr24 Difference is above threshold	NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_ TECH_AGM >5.00 >0.50 >0.50 = TRUE >0.01 >0.01 >0.01	All of the following conditions are met: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** IBS Configuration Diagnostic Continuous Enable is **TRUE** Battery Monitor Module Data Incompatible Determination Historical Diagnostic Enable is **FALSE** No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = FALSE = U01B000 = P15FF00	5 seconds out of a 6 seconds window	Type B, 2 Trips
			Any of the following criteria are met IBS Config Return		All of the following conditions are met: System 12V Battery Voltage is above		1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Battery Type is NOT equal to Vehicle Battery Type Configuration Battery Nominal Return C20 is above threshold IBS Config Return Battery Cal #1 U40% is above threshold IBS Config Return Battery Cal #2 U80% is above threshold IfSOC Bounding Limit Configuration check is TRUE then following conditions are included SOC Bounding Limit Hr8 Difference is above the threshold SOC Bounding Limit Hr8 Difference is above the threshold SOC Bounding Limit Hr24 Difference is above threshold	NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_ TECH_AGM >5.00 >0.50 >0.50 = TRUE >0.01 >0.01 >0.01	threshold IBS NormalCommEnable is TRUE IBS Configuration Diagnostic Historical Enable is TRUE No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	>11.00 volts (with hysteresis disable < 10.00) = TRUE = TRUE = U01B000 = P15FF00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Wake-Up Not Detected	P16FD	Detects when a control module did not wake-up at time scheduled by the wake-up alarm at shutdown.	Real Time Clock has exceeded expected wake-up time as defined by alarms scheduled at shutdown	>= 1 failure to meet scheduled controller wake-up	Control Module wake-up not detected Diagnostic Enable calibration is **CbTRUE**	= CbTRUE	Variable, dependent on scheduled controller wake-up times at shutdown	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Off Timer Performance	P262B	This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active.	Count Up Test: Time difference between the current value and the previous value of the timer Range Test: The variation of the HWIO timer and mirror timer is	> 1.50 seconds > 0.25%.			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller sleep occurs Range Test: Once or twice per trip, performed when controller shutdown is initiated or run/ crank becomes active	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Security Peripheral Performance	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	3.00	Calibration enable	= CbTRUE		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	3 counts (equivalent to 600.01 milliseconds) 1,000.01 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or	>= 5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts CbFALSE (CbTRUE indicates enabled)	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communicati on With TCM	U0101	This DTC monitors for a loss of communication with the Transmission Control Module.	Message is not received from controller for Message $02E Message $031 Message $452	 >10,031.25 milliseconds >10,031.25 milliseconds >12,500.00 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: LI0073 not active If message is on Bus B: LI0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	 >= 5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A	U0146	This DTC monitors for a loss of communication with Gateway A.	Message is not received from controller for Message $425 Message $427 Message $20D Message $209 Message $561 Message $562	 > 12,500.00 milliseconds > 12,500.00 milliseconds > 10,625.00 milliseconds > 10,250.00 milliseconds > 12,500.00 milliseconds > 12,500.00 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: LI0073 not active If message is on Bus B: LI0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	 >= 5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With HVAC Control Module	U0164	This DTC monitors for a loss of communication with the HVAC Control Module.	Message is not received from controller for Message $49A Message $551 Message $553 Message $555 Message $557 Message $559 Message $55C Message $0B9 Message $0BA Message $550 Message $552 Message $554 Message $558	 >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >10,625.00 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: LI0073 not active If message is on Bus B: LI0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	 >= 5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $55A Message $55B Message $55D	>12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds	If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Radio	U0184	This DTC monitors for a loss of communication with the CSM	Message is not received from controller for Message $54E Message $54F	 > 12,500 milliseconds > 12,500 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: LI0073 not active If message is on Bus B: LI0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	>= 5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type C, No SVS "Emissions Neutral Diagnostic - Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Battery Monitor Module	U01B0	This DTC monitors for a loss of communication with the Battery Monitor Module on the LIN bus.	Message is not received from device for IBSAmpHrChrg_Rsp_PDU IBSAmpHrDisChrg_Rsp_PDU IBSBattCrnkData_Rsp_PDU IBSBattLINOffData_Rsp_PDU IBSBattStatusData_Rsp_PDU IBSCfgWakeupData_Rsp_PDU IBSCurrentFOMData_Rsp_PDU IBSDiagDet_Rsp_PDU IBSMeasuredTemp_Rsp_PDU IBSMinCrnkData_Rsp_PDU IBSMVISOFData_Rsp_PDU IBSSOCData_Rsp_PDU IBSVoltageFOMData Rsp	 >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=12,600.00 milliseconds >=10,725.00 milliseconds >=10,725.00 milliseconds >=12,600.00 milliseconds >=10,725.00 milliseconds >=12,600.00 milliseconds >=12,600.00	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory:	 CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates present) >= 5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 250ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			_PDU	milliseconds	Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From ECM/ PCM	U0401	This DTC monitors for an error in communication with the ECM.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for:		Time since power-up reset, running reset, recovery from under/over voltage condition	>= 5,000 milliseconds	Executes in 10ms loop.	Type B, 2 Trips
					All the following conditions are met for	>= 3,000 milliseconds		
			ESP-ARC:	8 fail counts out of 10 sample counts	Partial Network is active			
			ECXCI1_ARC:	8 fail counts out of 10 sample counts	Power Mode	= Run		
					Battery Voltage	>11.00 Volts		
			DRCDNDP-ARC:	8 fail counts out of 10 sample counts				
			PSP-ARC:	8 fail counts out of 10 sample counts				
			VSADP_ARC:	8 fail counts out of 10 sample counts				
			OATP_ARC:	8 fail counts out of 10 sample counts				
			EHCCLARC:	8 fail counts out of 10 sample counts				
			EHCC_ICS:	14 fail counts out of 18 sample counts				
			ESP_MAC:	14 fail counts out of 18 sample counts				
			DRCDNDP_MAC:	14 fail counts out of 18 sample counts				
			PSP-MAC:	14 fail counts out of 18 sample counts				
				14 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			VSADP_MAC: OATP_MAC: BVSCRP-ARC: BVSCRP_MAC: VSANDP-ARC: VSANDP_MAC:	18 sample counts 14 fail counts out of 18 sample counts 15 fail counts out of 16 sample counts 15 fail counts out of 16 sample counts 8 fail counts out of 10 sample counts 14 fail counts out of 18 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transmission Control Module	U0402	This DTC monitors for an error in communication with the TCM.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for: TEGP-ARC: TEGP-MAC:	 15 fail counts out of 16 sample counts 15 fail counts out of 16 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Brake System Control Module	U0418	This DTC monitors for an error in communication with the BSCM.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for: DMCP_ARC: DMCP_MAC: EPBSP_ARC: EPBSP-MAC:	 8 fail counts out of 10 sample counts 14 fail counts out of 18 sample counts 15 fail counts out of 16 sample counts 15 fail counts out of 16 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From HVAC Control Module	U0424	This DTC monitors for an error in communication with the HVAC Control Module.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for: HVACFCRTLCFLI2_ARC: HVACFCRTLCFRI2_ARC : HVACFCRACH-ARC: HVACFCRADSCF_ARC: HVACFCRADSF_ARC: HVACFCRBLCFOR-ARC : HVACFCRBLCF_ARC: HVACFCRBLF_ARC: HVACFCRDP_ARC: HVACFCRRFA_ARC: HVACFCRTLCFLOR1n2_	8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts 8 fail counts out of 10 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage OBD Manufacturer Enable Counter (MEC)	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts = 0	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ARC:	8 fail counts out of 10 sample counts				
			HVACFCRTLCFL-ARC:	8 fail counts out of 10 sample counts				
			HVACFCRTLCFOR3_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRTLCFROR1 n2_ ARC:	8 fail counts out of 10 sample counts				
			HVACFCRTLCFR_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRTLF_ARC:	14 fail counts out of 18 sample counts				
			HVACFCRTLCFLI2_CS:	14 fail counts out of 18 sample counts				
			HVACFCRTLCFRI2_CS:	14 fail counts out of 18 sample counts				
			HVACFCRADSCF-CS:	14 fail counts out of 18 sample counts				
			HVACFCRADSFJDS:	14 fail counts out of 18 sample counts				
			HVACFCRBLCFOR_CS:	14 fail counts out of 18 sample counts				
			HVACFCRBLCF-CS:	14 fail counts out of 18 sample counts				
			HVACFCRBLF-CS:	14 fail counts out of 18 sample counts				
			HVACFCRDPJDS:	14 fail counts out of 18 samole counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			HVACFCRRFA_CS: HVACFCRTLCFLOR1 n2_ CS: HVACFCRTLCFL-CS: HVACFCRTLCFOR3_CS: HVACFCRTLCFROR1 n2_ CS: HVACFCRTLCFR_CS: HVACFCRTLF_CS:	14 fail counts out of 18 sample counts 14 fail counts out of 18 sample counts 14 fail counts out of 18 sample counts 14 fail counts out of 18 sample counts 14 fail counts out of 18 sample counts 14 fail counts out of 18 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Gateway A	U0447	This DTC monitors for an error in communication with the CGM.	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for: BSPMP_ARC: BSPMP_MAC:	 15 fail counts out of 16 sample counts 15 fail counts out of 16 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radio	U0485	This DTC monitors for an error in communication with the CSM	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for:		Time since power-up reset, running reset, recovery from under/over voltage condition		Executes in 10ms loop.	Type C, No SVS "Emissions Neutral Diagnostic - Type C"
					All the following conditions are met for	>= 5,000 milliseconds		
			HVACICR1_ARC:	8 fail counts out of 10 sample counts	Partial Network is active	>= 3,000 milliseconds		
					Power Mode	= Run		
			HVACICR1_CS:	14 fail counts out of 18 sample counts	Battery Voltage	>11.00 Volts		
			HVACICR2_ARC:	8 fail counts out of 10 sample counts				
			HVACICR2_CS:	14 fail counts out of 18 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Left Front Temperature Actuator	U0659	This DTC monitors for a loss of communication with the Left Front Temperature Actuator on the LIN bus.	Message is not received from device for AHDA02_Rsp_PDU	>= 11,500 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If power mode = Accessory:	CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) >=5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 600ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Right Front Temperature Actuator	U065A	This DTC monitors for a loss of communication with the Right Front Temperature Actuator on the LIN bus.	Message is not received from device for AHDA03_Rsp_PDU	>= 11,500 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If power mode = Accessory:	CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) >=5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 600ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Body Control Module Local Interconnect Network 6	U152A	This DTC monitors for a loss of communication on the LIN bus.	Loss of Communication Method: The total number of diagnostic enabled slave nodes on LIN Bus Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	= Total number of slave nodes on LIN Bus that have reported lost communications DTCs >= 10 counts	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or	CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) >=5,000 milliseconds >=3,000 milliseconds >11.00 Volts <=18.00 Volts CbFALSE (CbTRUE indicates enabled)	LIN bus communication executes in 600ms loop. Dependent on bus loading.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Body Control Module Local Interconnect Network 9	U152D	This DTC monitors for a loss of communication on the LIN bus.	Loss of Communication Method: The total number of diagnostic enabled slave nodes on LIN Bus Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	= Total number of slave nodes on LIN Bus that have reported lost communications DTCs >= 10 counts	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled	CbTRUE (CbTRUE indicates enabled) CbTRUE (CbTRUE indicates enabled) >=5,000 milliseconds >=3,000 milliseconds >11.00 Volts <=18.00 Volts CbFALSE (CbTRUE	LIN bus communication executes in 250ms loop. Dependent on bus loading.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Brake System Control Module 1 on CAN Bus 2	U1610	This DTC monitors for a Lost Communication with Brake System Control Module on CAN Bus 2 error as determined by the BCM	Message is not received from controller for Message $211 Message $21B Message $42A Message $012 Message $015 Message $017 Message $415 Message $417 Message $4B5 Message $028 Message $210	 >10,625.00 milliseconds >10,625.00 milliseconds >12,500.00 milliseconds >10,025.00 milliseconds >10,025.00 milliseconds >10,025.00 milliseconds >10,250.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >10,025.00 milliseconds >10,625.00 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	 >= 5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If power mode = Run/Propulsion/Start: Power Mode is run If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	CbFALSE (CbTRUE indicates enabled) >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Engine Control Module on CAN Bus 2	U1611	This DTC monitors for a Lost Communication with Engine Control Module on CAN Bus 2 error as determined by the BCM.	Message is not received from controller for Message $011 Message $01C Message $01D Message $213 Message $21D Message $227 Message $229 Message $22A Message $41D Message $499 Message $4BB Message $4BC Message $4C1	>10,031.25 milliseconds >10,031.25 milliseconds >10,031.25 milliseconds >10,250.00 milliseconds >10,250.00 milliseconds >10,625.00 milliseconds >10,250.00 milliseconds >10,625.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >11,250.00 milliseconds	General Enable Criteria: Time since power-up reset, running reset, recovery from under/over voltage condition All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller	>= 5,000 milliseconds >= 3,000 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 10 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $087	>10,062.50 milliseconds	If power mode = Run/Propulsion/Start:			
			Message $41F	>12,500.00 milliseconds	Power Mode is run			
			Message $214	>10,625.00 milliseconds	If power mode = Accessory:			
			Message $4BD	>12,500.00 milliseconds	Off key cycle diagnostics are enabled Or	CbFALSE (CbTRUE indicates enabled)		
			Message $254	>10,625.00 milliseconds	Controller is an OBD controller			
			Message $222	>10,250.00 milliseconds	Controller shutdown is not impending			
			Message $546	>12,500.00 milliseconds	Power Mode is not run/ crank			
			Message $4E8	>12,500.00 milliseconds	Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Key Table Not Provisioned / Authoritative Counter At Maximum	U1960	This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value	During controller initialization:
			
			IF (Any Security Peripheral Key Slot reports as Empty)
			-OR-
			(Any Authoritative Counter is at MAX value)
			
			During controller operation:
			
			IF (A Security Peripheral Key Slot reports as Empty)
			-OR-
			(An Authoritative Counter is at MAX value)
					Calibration enable	= CbTRUE		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Security Peripheral Performance	U1961	This DTC indicates that the ECU security peripheral has reported that it has failed.	The ECU security peripheral reports that the security peripheral hardware has failed.		Calibration enable	= CbTRUE		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Authenticate Serial Data Message	U1962	This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle.	Message authentication on a single key slot has failed a configurable number of times.	60	Calibration enable	= CbTRUE		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Input Power Circuit A/B Correlation	U3018	This diagnostic verifies that both (A and B) control module input power voltage sensors (when there are two) are neither inappropriately high nor low. It compares the sensed control module voltage A with sensed control module voltage B. If the absolute value of the difference between voltage A and B is greater than the failure threshold for sufficient time, the diagnostic will fail.	Difference between 12V Battery Power Circuit A and 12V Battery Power Circuit B	> 4.00V	Control Module Input Power Circuit A/B Correlation Diagnostic Enable calibration is **CbTRUE** 12V Starter Engaged	= CbTRUE = FALSE	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
CGM Battery Voltage Low Detected	B2B11	This monitoring checks the system voltage and sets a fault if it is below 7.0V with a calibratable X of Y debounce strategy.	Vehicle Supply Voltage with a debounce strategy of X of Y	< 7.0 +/- 0.5V = 320 = 400	Any participating Partial Network Control module operational software	= Active = Executing	4[sec] for pass min 3.2[sec] for fail	Type C - No MIL
Bus-Off detected on Communication CAN Bus 1	U1002	This fault is set if Communication CAN Bus 1 enters the Bus-Off state	Bus Off Event on CAN Bus 1 FOR	= TRUE >= 2.1 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Control Module Communication Bus Off Power Mode Time	100[msec] for pass 2.1[sec] for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 2	U2413	This fault is set if Communication CAN Bus 2 enters the Bus-Off state	Bus Off Event on CAN Bus 2 FOR	= TRUE >= 2.1 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Control Module Communication Bus Off Power Mode Time	100[msec] for pass 2.1[sec] for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 3	U1004	This fault is set if Communication CAN Bus 3 enters the Bus-Off state	Bus Off Event on CAN Bus 3 FOR	= TRUE >= 2.1 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Control Module Communication Bus Off Power Mode Time	100[msec] for pass 2.1[sec] for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 5	U1006	This fault is set if Communication CAN Bus 5 enters the Bus-Off state	Bus Off Event on CAN Bus 5 FOR	= TRUE >= 2.1 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Control Module Communication Bus Off Power Mode Time	100[msec] for pass 2.1[sec] for fail	Type B 2 Trips
Internal memory failure on the CGM Detected	B2B12	This monitoring checks whether a double bit ECC error has occurred in code flash or RAM. This fault is set if an ECC error has occurred.	ECC Error Detected	= TRUE	N/A	N/A	50ms	Type B 2 Trips
		This monitoring checks and sets a fault if a defect in the data flash (NVM) is detected.	NVM Fault Detected	= TRUE	N/A	N/A	1.5 us	
Microcontroller Performance Failure Detected	B2B13	This monitoring shall check the CPU by running an instruction test followed by a register test.	Instruction test failed OR Register test failed	= TRUE = TRUE	N/A	N/A	1.5 us	Type B 2 Trips
		This monitoring shall check whether any clock monitoring interrupts have occurred. If any clock monitoring interrupts have occurred this fault shall be set.	Clock Monitoring Interrupt Occurred	= TRUE	N/A	N/A		
Loss of Communication with the BCM Detected	U2203	This monitoring shall check a supervised message from the BCM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communication with the DEFC Detected	U2204	This monitoring shall check a supervised message from the DEFC for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >- 2.5 x nominal periodic rate - 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the EBCM on CAN1 Detected	U2418	This monitoring shall check a supervised message from the EBCM for communication status on CAN channel 1. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >- 2.5 x nominal periodic rate - 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) - Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the EBCM on CAN2 Detected	U2419	This monitoring shall check a supervised message from the EBCM for communication status on CAN channel 2. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >- k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the ECM Detected on CAN2	U241C	This monitoring shall check a supervised message from the ECM for communication status on CAN channel 2. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >- 2.5 x nominal periodic rate - 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>- k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >- k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the ECM Detected on CAN3	U241D	This monitoring shall check a supervised message from the ECM for communication status on CAN channel 3. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the EPS Detected	U2205	This monitoring shall check a supervised message from the EPS for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communication with the HVAC_FP_F Detected	U2209	This monitoring shall check a supervised message from the HVAC_FP_F for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >- 2.5 x nominal periodic rate - 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the HVAC_FP_R Detected	U220A	This monitoring shall check a supervised message from the HVAC_FP_R for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >- 2.5 x nominal periodic rate - 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) - Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the SDM Detected	U220C	This monitoring shall check a supervised message from the SDM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>- k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the SIB Detected	U220D	This monitoring shall check a supervised message from the SIB for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >- 2.5 x nominal periodic rate - 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the TCCM Detected	U220E	This monitoring shall check a supervised message from the TCCM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate - 1 second - 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the TCM Detected	U220F	This monitoring shall check a supervised message from the TCM for communication status. If the CGM has not received the message for 2.5x of its periodic rate plus an additional delay of 4 seconds, then this fault shall be set.	Supervised message not received FOR WHERE nominal periodic rate with an additional delay	= TRUE >= 2.5 x nominal periodic rate = 1 second = 4 seconds	Vehicle Supply Voltage AND Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Central Gateway Module Received Invalid Data From Body Control Module	U137F	This diagnostic monitors invalid data received from the BCM. If X (default = 3) invalid data are received within Y (default = 1.5) seconds, the fault is set. If X+l valid data are received with Y seconds, the fault is cleared.	Invalid BCM data instances WITHIN	>= X (default of 3) <= Y (default 1.5) seconds	k_OBD_APP_BCM_InvalidData_cal Vehicle Supply Voltage AND Any participating Partial Network FOR	= True >= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= kjnvalid Data Received from BCM Power Mode Time	0.75 [sec] min 1.5 [sec] max	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Key Table Not Provisioned	U1982	Upon start up, if the key table has not been provisioned, this fault is set. If the table is, or becomes, provisioned, it is cleared.	Key table is provisioned	= False	k_OBD_APP_KeyNotPovisioned_cal Vehicle Supply Voltage AND Any participating Partial Network FOR	- True >= k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) - Active >= k_Key Table Not Provisioned Diagnostic Time	150 [msec] min 5.0 [sec] max (startup)	Type B 2 Trips
Central Gateway Module Security Peripheral Performance	U1983	This diagnostic monitors the security peripheral and if the security peripheral indicates a fault or the key table is not provisioned, then this fault is set. Otherwise, it is cleared.	Security peripheral has a fault OR Key table is provisioned	= True = False	k_OBD_APP_SecurityPeripheralPerformance_cal Vehicle Supply Voltage AND Any participating Partial Network FOR	- True >- k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) - Active >= 5 seconds	150 [msec] min 5.0 [sec] max (startup)	Type B 2 Trips
Central Gateway Module Unable To Authenticate Serial Data Message	U1984	This diagnostic monitors for serial data message authentication failures. If X (default = 3) failures occur on a particular key slot, the fault is set. If X-I messages on a failed key slot authenticate, the fault is cleared.	Serial data authentication failure instances on a key slot	>= X (default of 3)	k_OBD_APP_UnableToAuthenticateSerialData_cal Vehicle Supply Voltage AND Any participating Partial Network FOR	= True > k_Battery Voltage Low Threshold (7V) < k_Battery Voltage High Threshold (30V) = Active >= 2 seconds	30 [msec] min 0.72 [sec] max 2.0 [sec] on startup	Type B 2 Trips
ECUIdentification List NVM Corruption	U197C	ECUIdentification List NVM Corruption Diagnostic	When the checksum of the memory that stores the learned content no longer matches the stored checksum.	= TRUE	Vehicle Supply Voltage U197700 ECUIdentification Self Learn Not Completed DTC	> k_Battery Voltage Low Threshold = >=7V < k_Battery Voltage High Threshold = >=30V = Not Set	1.5 [sec] min 5 [sec] max on startup	Type B 2 Trips
Self-Learn Did Not Execute	U197B	Self Learn Did not Execute Diagnostic	Unlearn all ECU's or do not self learn any of the ECU's	= TRUE	System Power mode Any participating Partial Network FOR	= OFF = Active >= 2 seconds	150 [msec] min 500 [msec] max on startup	Type B 2 Trips
Self-Learn Invalid Due to VIN Mismatch	U197D	Self Learn Invalid Due to VIN Mismatch Diagnostic	When all 17 characters of the DID $F190 i.e. Vehicle Identification Number do not match all 17 characters of VIN being broadcasted. OR When last 8 characters of the DID $F190 i.e. Vehicle Identification Number do not match the last 8 characters of VIN being broadcasted.	= TRUE = TRUE	When last 8 digits of Vehicle Identification Number (i.e. DID $F190) are checked OR When all 17 digits of Vehicle Identification Number (i.e. DID $F190) are checked AND U300251 Vehicle Identification Number - Not Programmed DTC	= True =True = Not Set	500 [msec] min 5 [sec] max on startup	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor Reference Voltage 1 Low Voltage	P1018	This monitoring checks if the UTLC Sensor 5V supply is lower than expected	Quality sensor power supply voltage	≤ 4.75V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.2s Failure out of 20 samples Time basis = 0.01s	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 1 High Voltage	P1019	This monitoring checks if the UTLC Sensor 5V supply is higher than expected	Quality sensor power supply voltage	≥ 5.25V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.2s Failure out of 20 samples Time basis = 0.01s	Type A, 1 Trip
Engine Diagnostic Status Signals Message Counter Incorrect	P10C6	The diagnostic monitor detects an alive rolling count error or checksum error in any of the Sensor Bus 1 CAN frames $1E2,$2C6, $2F6, $2F7,and $4CA sent by ECM that is received by Reductant Control Module (DEFC).	If the frames counter value increments in the order (0->1->2->3->0->...), with wrap-around after 3, then the diagnostic reports pass. If any value is not in the order listed for any of the frames, then the diagnostic reports fail. OR		[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	5s Failure out of 10 to 200 samples (depending on the CAN Frame IDs transmit rate) Diagnostics check every received message (0.025s or 0.1s or 0.5s)	Type A, 1 Trip
			if any of the frames checksum	* computed cheksum				
Reductant Control Module Sensor Reference Voltage 2 Low Voltage	P10C9	This monitoring checks if the reductant pressure sensor 5V supply is lower than expected	Pressure sensor power supply voltage	≤ 4.75V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4s Failure out of 40 samples Time basis = 0.01s	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 2 High Voltage	P10CA	This monitoring checks if the reductant pressure sensor 5V supply is higher than expected	Pressure sensor power supply voltage	≥ 5.25V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4s Failure out of 40 samples Time basis = 0.01s	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Control Circuit Shorted	P10D9	This monitoring checks if at least one heater high side and low side are shorted together. The 3 reductant heaters (2 tank heaters, and 1 supply line heater) share a low side driver, and therefore cannot pinpoint which heater is faulted. While heaters are commanded off, shorted high side to low side faults are indistinguishable to an unfaulted heater. Upon the presence of certain heater circuit faults, the heater driver hardware will enter a self-protection mode and will shut off automatically. Other heater circuit diagnostics can be diagnosed while the heaters are off. If no fault is confirmed after sufficient time with the heaters off, the heaters are commanded back on. A shorted high side to low side fault is confirmed after the heaters have automatically shut off via hardware protection sufficient times without confirming the presence of any other circuit faults.	Heater driver hardware protection has shut off heaters due to the following conditions: [Low side FET drain OR load current] AND Error Counter Note1: The control system will determine that other circuit faults are not detected, and the heaters will be commanded back on when the following criteria are met: ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side Note2: A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the Error counter threshold.	 > 0.45 V > 95 A > 4 < 0.909V > 0.767V < 0.613V > 0.487V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Heater power supply voltage Proplusion System [Heater 1 PWM Command OR Heater 2 PWM Command OR Heater 3 PWM Command] No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 5.7V = ACTIVE > 0% > 0% > 0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20BA P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1.2 s Failure out of 4 samples Success out of 12 samples Time basis = 0.2s Recovery only at next driving cycle Note: The Error counter is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type A, 1 Trip
Reductant Control Module Ignition On/Start Switch Circuit High Voltage	P10DA	This monitoring checks if the Run/Crank wired input on the DEF controller is high, when it is expected to be low	Run/Crank wired input state AND Run/Crank received over CAN	= HIGH = LOW	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	3 s Failure out of 300 samples Time basis = 0.01s	Type A, 1 Trip
Reductant Control Module Ignition On/Start Switch Circuit Low Voltage	P10DB	This monitoring checks if the Run/Crank wired input on the DEF controller is low, when it is expected to be high	Run/Crank wired input state AND Run/Crank received over CAN	= LOW = HIGH	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	3 s Failure out of 300 samples Time basis = 0.01s	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Heater Supply Circuit Low	P10DC	This monitoring checks if the reductant tank heater supply voltage is lower than reductant controller permanent power supply voltage	ECU power supply voltage - Tank heater power supply voltage	> 3.3V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Propulstion System Active Time after controller initialization Engine cranking (recieeved over CAN) Pump State No DCU internal fault Note 1: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = ACTIVE > 0.51s = FALSE * After-run P20FF & P10F4	0.5s Failure out of 50 samples Time basis = 0.01s	Type B, 2 Trips
Reductant Control Module Heater Supply Circuit High	P10DD	This monitoring checks if the reductant tank heater supply voltage is greater than reductant controller permanent power supply voltage	Tank heater power supply voltage - ECU power supply voltage	> 3.3V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Propulstion System Active Time after controller initialization Engine cranking (recieeved over CAN) Pump State No DCU internal fault Note 1: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = ACTIVE > 0.51s = FALSE * After-run P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Control Circuit Shorted	P10F3	This monitoring checks if at least one heater high side and low side are shorted together. The 3 reductant heaters (2 tank heaters, and 1 supply line heater) share a low side driver, and therefore cannot pinpoint which heater is faulted. While heaters are commanded off, shorted high side to low side faults are indistinguishable to an unfaulted heater. Upon the presence of certain heater circuit faults, the heater driver hardware will enter a self-protection mode and will shut off automatically. Other heater circuit diagnostics can be diagnosed while the heaters are off. If no fault is confirmed after sufficient time with the heaters off, the heaters are commanded back on. A shorted high side to low side fault is confirmed after the heaters have automatically shut off via hardware protection sufficient times without confirming the presence of any other circuit faults.	Heater driver hardware protection has shut off heaters due to the following conditions: [Low side FET drain OR load current] AND Error Counter Note1: The control system will determine that other circuit faults are not detected, and the heaters will be commanded back on when the following criteria are met: ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side Note2: A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the Error counter threshold.	> 0.45 V > 95 A > 4 < 0.909V > 0.767V < 0.613V > 0.487V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Heater power supply voltage Proplusion System [Heater 1 PWM Command OR Heater 2 PWM Command OR Heater 3 PWM Command] No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 5.7V = ACTIVE > 0% > 0% > 0% P20FF, P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20BA & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1.2 s Failure out of 4 samples Success out of 12 samples Time basis = 0.2s Recovery only at next driving cycle Note: The Error counter is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type A, 1 Trip
Reductant Control Module Not Programmed	P10F4	This monitoring checks if the ECU is a service part that has not been programmed with application specific software and calibration.	Software Operational Reference Calibration AND MEC Note: Software operational reference calibration is set to true if application specific calibration has been flashed.	= FALSE = 0	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up]	= ACTIVE = ACTIVE = ACTIVE	No debounce applied Once at ECU initialization	Type A, 1 Trip
Reductant Control Module Sensor Reference Voltage 3 Low Voltage	P131B	This monitoring checks if the reductant temperature sensor 5V supply is lower than expected	Reducant temperature sensor power supply voltage	≤ 4.8V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Sensor Reference Voltage 3 High Voltage	P131C	This monitoring checks if the reductant temperature sensor 5V supply is higher than expected	Reducant temperature sensor power supply voltage	≥ 5.3V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s	Type A, 1 Trip
Reductant Heater 3 Control Circuit Shorted	P143C	This monitoring checks if at least one heater high side and low side are shorted together. The 3 reductant heaters (2 tank heaters, and 1 supply line heater) share a low side driver, and therefore cannot pinpoint which heater is faulted. While heaters are commanded off, shorted high side to low side faults are indistinguishable to an unfaulted heater. Upon the presence of certain heater circuit faults, the heater driver hardware will enter a self-protection mode and will shut off automatically. Other heater circuit diagnostics can be diagnosed while the heaters are off. If no fault is confirmed after sufficient time with the heaters off, the heaters are commanded back on. A shorted high side to low side fault is confirmed after the heaters have automatically shut off via hardware protection sufficient times without confirming the presence of any other circuit faults.	Heater driver hardware protection has shut off heaters due to the following conditions: [Low side FET drain OR load current] AND Error Counter Note1: The control system will determine that other circuit faults are not detected, and the heaters will be commanded back on when the following criteria are met: ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side Note2: A fault is confirmed when the Error Counter (based on number of heater transitions between the on and off states) exceeds the Error counter threshold.	> 0.45 V > 95 A > 4 < 0.909V > 0.767V < 0.613V > 0.487V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Heater power supply voltage Proplusion System [Heater 1 PWM Command OR Heater 2 PWM Command OR Heater 3 PWM Command] No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank temperature sensor Tank temperature power supply Heater 1 Heater 2 Heater 3 Heater power supply CAN communication Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 5.7V = ACTIVE > 0% > 0% > 0% P20FF & P10F4 P205B &P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P20BA & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	Up to 1.2 s Failure out of 4 samples Success out of 12 samples Time basis = 0.2s Recovery only at next driving cycle Note: The Error counter is incremented by 6 each time the heater is turned off and back on, but decremented by 1 each time loop that the heater is on.	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Resistance Performance	P149F	This monitor checks if the reductant pump resistance is too low during the pump heating phase.	Pump driver power supply * duty cycle / measured driver current OR	< 0.23Ω	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state Measured pump driver current Note: Pump heating is disabled in response to the following faults: Pressure Sensor fault Reductant Pump fault Pressure sensor power supply fault CAN communication fault Hardwired Run/Crank No DCU internal fault Note 1: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = Heating > 0A P204B & P204C & P204D & P204E P249C & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB P20FF & P10F4	8 s Failure out of 800 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip
		This monitor checks if the reductant pump resistance is too high during the pump heating phase.	Pump driver power supply * duty cycle / measured driver current	> 0.8Ω				
Reductant Level Sensor Circuit Range/Performance	P203B	This monitor checks if reductant level measurements are not available when they are expected to be available. The ultrasonic level sensor transmits a readiness bit with each level measurement to identify when the sensor has low confidence in the fluid height (level) measurement due to a weak, missing, or inconsistent echo returned to the piezo element. This monitor specifically checks if the readiness bit is false when it is expected to be true.	Reductant Level Readiness Bit	= FALSE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Time since last Refill / Draining Estimated DEF Level Reductant tank temperature Reductant UTLC temperature Heater 1 PWM Command Heater 3 PWM Command Slosh Detection Flag Tank Agitation Flag Vehicle speed No Level Sensor voltage fault No SENT communication fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE > 300s > 5L > 0°C > 3°C = 0% = 0% = FALSE = TRUE > 2km/h P203C & P203D U2627 & U2628 & U2630 P20FF & P10F4	200s Failure out of 2000 samples Success out of 6 samples Time basis = 0.1s	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Level Sensor Circuit Low Voltage	P203C	This monitor checks if the reductant level sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating either piezo excitation voltage faults or piezo circuit faults are detected is transmitted to the DEFC on the SENT bus.	[PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] Note: 1. All signals are transmitted by UTLC sensor, where it is internally computed. 2. PZT conditions are based on a single diagnosis status bit transmitted by the UTLC sensor	> 5.5V < 4.5V > 2.0V < 0.125V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT Communication Fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type B, 2 Trips
Reductant Level Sensor Circuit High Voltage	P203D	This monitor checks if the reductant level sensor signal is out of range high. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating that the reductant level measurement is greater than the maximum measureable range is transmitted to the DEFC on the SENT bus.	Reductant Level measurement AND Reductant Level readiness bit Note: Reductant Level readiness flag is broadcasted by the smart UTLC sensor to Reductant Control Module	> 400 mm = TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT Communication Fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	6 s Failure out of 12 samples Sucess out of 4 samples Time basis = 0.5s	Type B, 2 Trips
Reductant Pressure Sensor Performance	P204B	This monitor checks if the reductant pressure sensor measure is lower than ambient pressure before the system is pressurized.	Reductant pressure OR Time when pumping internal debounce counter has not reached pass/fail decision maturation	< -36.4 kPa > 1s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state No Pressure Sensor fault No DCU internal fault Note: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = Startup P204C & P204D P20FF & P10F4	Up to 33 s (3x1s timeout + 2x15s wait) Malfunction criteria confirmation out of 88 samples Time basis = 0.01s Failure confirmation after two retries Recovery only at next driving cycle Note: See "Repeat Defrost" sheet for retries definition	Type A, 1 Trip
		This monitor checks if the reductant pressure sensor measure is greater than ambient pressure before the system is pressurized.	Reductant pressure OR Time when puming internal debounce counter has not reached pass/fail decision maturation	> 36.4 kPa > 1s				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pressure Sensor Circuit Low Voltage	P204C	This monitor checks if the reductant pressure sensor is shorted to ground or open circuit by monitoring the pressure sensor output voltage and failing the diagnostic when this voltage is too low. The reductant pressure sensor is an analog pressure sensor in which the voltage across the sensor is proportional to the measured pressure.	Reductant pressure sensor voltage Note: Pressure variable is saturated to -50kPa for 0.35V ≤ Voltages < 0.5V. Additionally, pressure variable is set to 0kPA for Voltages < 0.35V.	< 0.45V (-50 kPa)	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip
Reductant Pressure Sensor Circuit High Voltage	P204D	This monitor checks if the reductant pressure sensor is shorted to power by monitoring the pressure sensor output voltage and failing the diagnostic when this voltage is too high. The reductant pressure sensor is an analog pressure sensor in which the voltage across the sensor is proportional to the measured pressure.	Reductant pressure sensor voltage Note: Pressure variable is saturated to 900kPa for 4.5V < Voltages ≤ 4.75V. Additionally, pressure variable is set to 0kPA for Voltages > 4.75V.	> 4.90V (0 kPa)	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 10ms	Type A, 1 Trip
Reductant Pressure Sensor Circuit Intermittent/Erratic	P204E	This monitor checks if the reductant pressure signal is erratic. A fail is detected when the change in pressure between two samples is greater than expected.	ABS[Pressure sensor signal(t) - pressure sensor signal (t - sample time)] / sample time	> 10 000kPa/s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Time after controller initialization No Pressure Sensor fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE > 0.510s P204C & P204D P20FF & P10F4	0.05 s Failure out of 5 samples Time basis = 10ms	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor Performance	P205B	This monitor checks if, at key on, the reductant temperature sensor is coherent with average value among all the available system temperature sensors (exhaust temperature sensors, coolant temperature sensor, fuel temperature sensor, ambient temperature sensor, intake temperature sensor). The number of sensors used for the average calculation shall be at least 4 but which sensor to use is calibratable and the sensor should not be faulted. The average temperature is calculated at the system start up after a calibratable engine stop when all the temperature sensors are expected to be stabilized.	Latched average system startup reference temperature - reductant tank temperature sensor OR Reductant tank temperature sensor - latched average system startup reference temperature	≥ 30°C ≥ 30°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] [Average engine startup reference temperature mask AND Time after controller initialization AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor fault No CAN communication fault No ECU power supply faults No DCU internal fault Note1: Average engine start-up reference temperature mask is set to true if : Engine off time AND At least 4 sensors used in average engine startup reference temperature are: Note2: The malfunction criteria is compared 60s after the first reception of Average engine start-up reference temperature mask if the faults listed in enable conditions are not active.	= ACTIVE = ACTIVE = ACTIVE = "Use Data" > 1s < 3.5 s P205C & P205D & P205E P10C6 & U2626 & U2412 P21CB P20FF and P10F4 ≥ 8hrs = Valid	0.3 s Failure out of 3 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Tank Temperature Sensor Circuit Low Voltage	P205C	This monitor checks if the reductant temperature sensor signal is shorted to ground or open circuit by monitoring the temperature sensor output voltage and failing the diagnostic when this voltage is too low. The reductant temperature sensor is a thermistor in which the voltage across the sensor can be equated to a temperature. A lower voltage is equivalent to a higher temperature.	Reductant temperature sensor signal voltage	< 0.3 V (75°C)	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor Circuit High Voltage	P205D	This monitor checks if the reductant temperature sensor signal is shorted to power by monitoring the temperature sensor output voltage and failing the diagnostic when this voltage is too high. The reductant temperature sensor is a thermistor in which the voltage across the sensor can be equated to a temperature. A higher voltage is equivalent to a lower temperature.	Reductant temperature sensor signal voltage	> 4.75V (-40°C)	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type A, 1 Trip
Reductant Tank Temperature Sensor Circuit Erratic	P205E	This monitor checks if the reductant temperature signal is erratic. A fail is detected when the change in temperature between two samples is greater than expected.	ABS[Tank temperature sensor signal(t) - tank temperature sensor signal (t - sample time)] / sample time	> 100°C/s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No Temperature Sensor fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P205C & P205D P20FF & P10F4	0.5 s Failure out of 5 samples Time basis = 0.1s	Type A, 1 Trip
Reductant Quality Sensor Circuit Range/Performance	P206B	This monitor checks if reductant quality measurements are not available when they are expected to be available. The ultrasonic quality sensor transmits a readiness bit with each the quality measurement to identify when the sensor has low confidence in the quality measurement due to a weak, missing, or inconsistent echo returned to the piezo element. This monitor specifically checks if the readiness bit is false when it is expected to be true.	Reductant Quality Readiness Bit	= FALSE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Time since last Refill / Draining Estimated DEF Level Reductant tank temperature Reductant UTLC temperature Heater 1 PWM Command Heater 3 PWM Command Slosh Detection Flag Tank Agitation Flag Vehicle speed No Level Sensor voltage fault No SENT communication fault No DCU internal fault Note: See "Level & Quality Performance" sheet for parameter definitions	= ACTIVE = ACTIVE = ACTIVE > 300s > 5L > 0°C & < 70°C > 3°C = 0% = 0% = FALSE = TRUE > 2km/h P206C & P206D U2627 & U2628 & U2630 P20FF and P10F4	60 s Failure out of 600 samples Success out of 40 samples Time basis = 0.1s	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Quality Sensor Circuit Low	P206C	This monitor checks if the reductant quality sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag indicating either quality measurement is lower than the minimum measureable range, piezo excitation voltage faults are detected, or piezo circuit faults are detected is transmitted to the DEFC on the SENT bus.	[(UTLC quality measurement AND Quality readiness bit) OR PZT Excitation Voltage OR PZT Excitation Voltage OR PZT Voltage OORH OR PZT Voltage OORL] Note: All related signals are directly transmitted by UTLC sensor, where it is internally computed. 2. PZT conditions are based on a single diagnosis status bit transmitted by the UTLC sensor	< 0% = TRUE > 5.5V < 4.5V > 2V < 0.125V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT Communication Fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, 1 Trip
Reductant Quality Sensor Circuit High Voltage	P206D	This monitor checks if the reductant quality sensor signal is out of range high. The DEFC receives the quality measurement and corresponding quality readiness bit from the smart UTLC sensor, and performs this check in the DEFC.	Reductant quality measurement AND Reductant Quality readiness bit Note: Reductant Quality readiness flag is broadcasted by the smart UTLC sensor to Reductant Control Module	> 63.25% = TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT Communication Fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, 1 Trip
Reductant Pump Control Circuit	P208A	This monitor checks if any of the 3 phase pump motor control circuits are open.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is Open On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Performance	P208B	This monitor checks if the commanded, arbitrated reducant pump speed and the sensed reductant pump speed are coherent.	ABS(Sensed pump speed - pump speed command)	> 712 rpm	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump State No DCU internal fault Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault Hardwired Run/Crank Note 1: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = Wait Authorization, OR = Priming, OR = Buildup, OR = Closed Loop Control, OR = Purge, OR = Reductant Delivery Performance, OR = AutoStop P20FF & P10F4 P204B & P204C & P204D & P204E P249C & P149F & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	63 s (2x15s fail to stabilize timeout + 2x15s wait time + 3s pump blocked confirmation) Malfunction criteria confirmation out of 300 samples Time basis = 10ms Failure confirmation after two retries. Between two retries, pump is stopped for 15s. When pressure hold is achieved, retries are no longer permitted and an effective retry is counted after 3s with the malfunction criteria met. Success is reported after maximum time that would be required to mature a fault has elapsed. Recovery is possible only on the next driving cycle Note 2: See "Repeat Defrost" sheet for retries definition	Type A, 1 Trip
Reductant Pump Control Circuit Low Voltage	P208C	This monitor checks if any of the 3 phase pump motor control circuits is shorted to ground.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is low voltage due to short to ground On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Pump Control Circuit High Voltage	P208D	This monitor checks if any of the 3 phase pump motor control circuits is shorted to power.	Off-line: Reductant Internal Driver device status indicating that Pump Circuit is high voltage to due to short to power On-line: Fault indication when back EMF is not detected every 60° leads to transition of pump to off-line state. Note: fault cannot be pinpointed in the pump on-state. Therefore, if fault is detected with the pump on, the pump will be commanded off, allowing to pin-point the specific failure mode	= TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 1 Control Circuit	P20B9	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 1.083V > 0.926V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Performance	P20BA	This monitoring checks if the reductant heater 1 (tank heater 1) resistance or power is outside operating limits.	(Reductant heater 1 high side voltage - Reductant heater 1 low side voltage) / Reductant heater 1 current OR	< 1.0Ω	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant heater 1 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2 Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P21DD & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
			(Reductant heater 1 high side voltage - Reductant heater 1 low side voltage) / Reductant heater 1 current OR	> 1.8Ω				
			Reductant heater 1 power command - Reductant heater 1 power OR	> 45W			10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	
			Reductant heater 1 power - Reductant heater 1 power command	> 45W				
Reductant Heater 1 Control Circuit Low Voltage	P20BB	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side and or side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 0.601V > 0.506V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Control Circuit High Voltage	P20BC	This monitoring checks if reductant heater 1 (tank heater 1) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	<u>If heater is commanded on:</u> [Low side FET drain OR load current] <u>If heater is commanded off:</u> [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V > 95A < 4.168V > 2.021V < 4.325V > 2.097V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 2 Control Circuit	P20BD	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	<u>If heater is commanded on:</u> [Low side FET drain OR load current] <u>If heater is commanded off:</u> [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 1.083V > 0.926V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Performance	P20BE	This monitoring checks if the reductant heater 2 (line heater) resistance or power is outside operating limits.	(Reductant heater 2 high side voltage - Reductant heater 2 low side voltage) / Reductant heater 2 current OR (Reductant heater 2 high side voltage - Reductant heater 2 low side voltage) / Reductant heater 2 current OR Reductant heater 2 power command - Reductant heater 2 power OR Reductant heater 2 power - Reductant heater 2 power command	< 2.8Ω > 7.5Ω > 21W > 21W	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant heater 2 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2 Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P21DD & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle 10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 2 Control Circuit Low Voltage	P20BF	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	<u>If heater is commanded on:</u> [Low side FET drain OR load current] <u>If heater is commanded off:</u> [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 0.601V > 0.506V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 Control Circuit High Voltage	P20C0	This monitoring checks if reductant heater 2 (line heater) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V > 95A < 4.168V > 2.021V < 4.325V > 2.097V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 3 Control Circuit/Open	P20C1	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are open circuit. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	If heater is commanded on: [Low side FET drain OR load current] If heater is commanded off: [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 1.083V > 0.926V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 3 Control Circuit Performance	P20C2	This monitoring checks if the reductant heater 3 (tank heater 2) resistance or power is outside operating limits.	(Reductant heater 3 high side voltage - Reductant heater 3 low side voltage) / Reductant heater 3 current OR	< 1.5Ω	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up]	= ACTIVE = ACTIVE = ACTIVE	8 s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
			(Reductant heater 3 high side voltage - Reductant heater 3 low side voltage) / Reductant heater 3 current OR	> 2.6Ω	Reductant heater 3 PWM command No DCU internal fault Note: Heater PWM command is set to zero in response to a fault on the:	> 0% P20FF & P10F4		
			Reductant heater 3 power command - Reductant heater 3 power OR	> 29W	Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 Heater 2	P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3	10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	
			Reductant heater 3 power - Reductant heater 3 power command	> 29W	Heater 3 Heater power supply fault CAN communication fault Hardwired Run/Crank	P221E & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 3 Control Circuit Low	P20C3	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are shorted to ground. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	<u>If heater is commanded on:</u> [Low side FET drain OR load current] <u>If heater is commanded off:</u> [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side]	 > 0.45V > 95A < 0.601V > 0.506V = 0V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 3 Control Circuit High	P20C4	This monitoring checks if reductant heater 3 (tank heater 2) control circuit high side or low side are shorted to power. A reductant heater control circuit circuit fault can only be pinpointed while the heater is commanded off. Therefore, if a failure is detected while the heater is commanded on, the heater is shut off allowing the diagnostic to mature and pinpoint the specific failure mode.	<u>If heater is commanded on:</u> [Low side FET drain OR load current] <u>If heater is commanded off:</u> [ADC voltage on high side AND ADC voltage high side AND ADC voltage low side AND ADC voltage low side]	 > 0.45V > 95A < 4.168V > 2.021V < 4.325V > 2.097V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Low Pressure	P20E8	This monitoring checks if reductant pressure is lower than the desired setpoint during closed loop pressure control operation when sufficient fluid in the DEF tank ensures reliable pressure control.	Reductant pressure setpoint - reductant pressure control signal	≥ 63 kPa	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state DEF Level Estimation No DCU internal fault Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault Hardwired Run/Crank Note2: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = Buildup, OR = Closed Loop Control, OR = Reductant Delivery Performance > 3L P20FF & P10F4 P204B & P204C & P204D & P204E P208B & P149F & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	30 s Failure out of 3000 samples Success out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant High Pressure	P20E9	This monitoring checks if reductant pressure is greater than the desired setpoint during closed loop pressure control operation when sufficient fluid in the DEF tank ensures reliable pressure control.	Reductant pressure control signal - reductant pressure setpoint	≥ 63 kPa	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state Engine Auto Stop Active DEF Level Estimation No DCU internal fault Note1: The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault Hardwired Run/Crank Note2: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = Buildup, OR = Closed Loop Control, OR = Reductant Delivery Performance = False > 3L P20FF & P10F4 P204B & P204C & P204D & P204E P208B & P149F & P20E9 & P2C11 & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Performance	P20FF	This monitoring checks if the Reducant Control Module has detected a RAM fault.	After writting a checker-board type pattern of 0's and 1's into the cells of a bit oriented memory, difference is found between any cells' expected contents Note: this test is executed with RamTst Vector module, using checkerboard algorithm		[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up]	= ACTIVE = ACTIVE = ACTIVE	No debounce applied Once at initialization	Type A, 1 Trip
		This monitoring checks if the Reductant Control Module has detected a dataset version that does not fit the SW version.	Computed checksum OR Software operational reference calibration is incompatible to the application software	* stored frame checksum				
		This monitoring checks if the Reductant Control Module has witnessed persistent data error in Non-Volatile Memory	Aborded write operation is detected on applied NVM blocks OR Calculated checksums of related NVM blocks Note: Apply on Application data & IUMPR data NVM blocks	* stored checksums				
		This monitoring checks if the Reductant Control Module has detected inconstitancy in data stored in Non-Volatile Memory	Aborded write operation is detected on applied blocks OR Computed data checksum of related NVM blocks OR Heater calibration are not learned during EOL Note: Apply on Heater calibration NVM blocks	* stored data checksum				
Reductant Pump High Current	P214E	This monitoring checks if the reductant pump motor output driver current exceeds the maximum operating limit current. Calibrateable over-current thresholds are defined for both pumping and heating modes. The pump can be controlled as a heater to increase frozen DEF defrost performance. Otherwise, the reductant pump motor will spin to move fluid into the reductant supply line at the desired pressure setpoint.	Reducant pump hardware protection OR [If Pump Mode = Heating: Reducant pump motor current Else: Reducant pump motor current]	= ACTIVE > 15A > 7A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	4 s Failure out of 1 sample in case of pump hardware protection is detected. Else, failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 High Current	P214F	This monitoring checks if the reductant heater 1 (tank heater 1) output driver current exceeds the maximum operating limit current.	Reductant heater 1 current	> 15A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Level Sensor 1 Stuck	P21C5	This monitor checks if reductant level measurements are available but stuck. The ultrasonic level sensor transmits a readiness bit with each the level measurement to identify when the sensor has low confidence in the fluid height (level) measurement due to a weak, missing, or inconsistent echo returned to the piezo element. If this readiness bit indicates that the level measurements are available, but the level measurements do not change sufficiently when tank fluid slosh is expected, this monitor will fail.	Reductant level sensor signal(t) - Reductant level sensor signal (t - 1000ms)	< 0.3mm	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Vehicle speed *(see note1)* Vehicle speed validity Vehicle long. acceleration (see *note4*) Urea state Filtered readiness flag *(see note2)* Estimated DEF Level No Level Sensor faults No Tank Temperature Sensor A faults No CAN communication faults No ECU power supply faults No SENT communication faults No DCU internal faults Note1: Vehicle speed shall be FALSE for 2 consecutive samples to disable this condition. Note2: Sensed level readiness bit shall be TRUE for 6 consecutive samples (600ms) to set the filtered readiness flag to TRUE. Sensed level readiness bit shall be FALSE for 1 sample (100ms) to set the filtered readiness flag to FALSE.	= ACTIVE = ACTIVE = ACTIVE ≥ 25km/h = TRUE > 0.1 m/s² = Liquid = TRUE > 5L P203B & P203C & P203D & P131B & P131C P205B & P205C & P205D & P205E P10C6 & U2626 & U2412 P21CB U2627 & U2628 & U2630 P20FF and P10F4	200s to Fail or 10s to Pass (Step-up/down: 1 / 20 Fail/pass count : 2000 / -2000 Time basis = 0.1s Note3: See "Level & Quality Performance" sheet for parameters definition Note4: Long. acc. is computed internally in Reductant Control Module from vehicle speed derivation.	Type B, 2 Trips
Reductant Control Module Supply Voltage Low Voltage	P21CB	This monitoring checks if measured reductant permanent power supply voltage is low compared to the vehicle system voltage (received by serial data from ECM)	ECM (Serial Data) Voltage - Reductant Permanent Power Supply Voltage	> 3V	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Engine Cranking (serial data) Engine Controller Sensed Powertrain Relay Voltage Mask No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE = False = True P20FF & P10F4	3 s Failure out of 300 samples Time basis = 0.01s	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Low Current	P21DD	This monitoring checks if the reductant heater 1 (tank heater 1) output driver current is below the minimum operating limit while the heater is commanded on.	Reductant heater 1 current	< 0.75A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant tank heater 1 PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P10D9 P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 2 Low Current	P221C	This monitoring checks if the reductant heater 2 (line heater) output driver current is below the minimum operating limit while the heater is commanded on.	Reductant heater 2 current	< 0.75A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant line heater PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P10F3 P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 2 High Current	P221D	This monitoring checks if the reductant heater 2 (line heater) output driver current exceeds the maximum operating limit current.	Reductant heater 2 current	> 15A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 3 Current Too Low	P221E	This monitoring checks if the reductant heater 3 (tank heater 2) output driver current is below the minimum operating limit current while the heater is commanded on.	Reductant heater 3 current	< 0.75A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Reductant tank heater 2 PWM command No DCU internal fault Note: Heaters PWM command is set to zero in response to a fault on the: Tank Temperature Sensor fault Tank Temperature power supply fault Heater 1 fault Heater 2 fault Heater 3 fault Heater power supply fault CAN communication fault Hardwired Run/Crank	= ACTIVE = ACTIVE = ACTIVE > 0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P20C2 & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2626 & U2412 P10DA & P10DB	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Heater 3 Current Too High	P221F	This monitoring checks if the reductant heater 3 (tank heater 2) output driver current exceeds the maximum operating limit current.	Reductant heater 3 current	> 15A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Excessive Time To Enter Closed Loop Reductant Injection Control	P249C	This monitoring checks if the reductant pressure does not stabilize to the desired setpoint within the expected time. If the control system determines that the DEF tank may be frozen, the pressure build-up command will be delayed until this defrost routine is complete. The defrost time is defined as a function of measured reductant tank temperature at key on. After this defrost time (or immediately, if no defrost routine was necessary) the control system will attempt a calibrateable number of pressure build-up attempts before this diagnostic reports a failure.	Pressure Closed Loop Control AND [Total time from the start of line filling OR Total time from the exit of Start & Stop] Note: See "Repeat Defrost" section for Pressure hold definition	* ACTIVE > 15s > 7.5s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump state Estimated DEF Level No DCU internal fault Note1: Pump is force to stop if: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault Hardwired Run/Crank Note2: When estimated DEF level is below the diagnostic enable (reporting threshold) noted above and the failure is confirmed after 1 retry, then “Reductant Tank Empty” flag is set, impacting low reductant driver warning and inducement. Note3: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = WaitAuthorization, OR = Priming, OR = Buildup, OR = Closed Loop Control > 3L P20FF & P10F4 P204B & P204C & P204D & P204E P149F & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB	75 s (3x15s timeout + 2x15s wait) Malfunction criteria confirmation out of 1500 samples Time basis = 0.01s Failure confirmation after two retries. Between two retries, pump is stopped for15s. Success is reported as soon as 'Pressure Closed Loop Control' is active. Recovery only at next driving cycle Note: See "Repeat Defrost" sheet for retries definition	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor B Circuit Range/Performance	P2ADA	This monitor checks if, at key on, the reductant UTLC temperature sensor is coherent with the reductant temperature sensor. This monitor runs only at system start up after a calibratable engine stop is elasped. At this time, all the temperature sensors are expected to be stabilized.	Reductant secondary device temperature information - reductant tank temperature sensor OR Reductant tank temperature sensor - reductant secondary device temperature information	≥ 21°C ≥ 21°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] [(Average engine startup reference temperature mask OR Service Tamper Bay test request) AND Time after controller initialization AND Time during which the cold soak flag is active when cold soak conditions are detected] No Tank Temperature Sensor A fault No Tank Temperature Sensor B fault No SENT communication fault No DCU internal fault Note1: Average engine start-up reference temperature mask is set to "Use Data" if : Engine Off Time Powertrain High Resolution AND At least 4 sensors used in average engine startup reference temperature are) Note2:The malfunction criteria is compared 60s after the first reception of Average engine start-up reference temperature mask if the faults listed in enable conditions are not active.	= ACTIVE = ACTIVE = ACTIVE = "Use Data" > 1s < 3.5 s P205B & P205C & P205D & P205E P2ADD & P2ADB & P2ADC U2627 & U2628 & U2630 P20FF and P10F4 ≥ 8hrs = Valid	3 s Failure out of 6 samples Time basis = 0.5s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Tank Temperature Sensor B Circuit Low	P2ADB	This monitor checks if the reductant UTLC temperature sensor signal is out of range low. This computation is performed in the smart UTLC sensor, and a corresponding error flag is transmitted to the DEFC on the SENT bus.	Reductant UTLC temperature measurement	< -50°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT communication fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5ms	Type A, 1 Trip
Reductant Tank Temperature Sensor B Circuit High	P2ADC	This monitor checks if the reductant UTLC temperature sensor signal is out of range high. This computation is performed in the smart UTLC sensor, and a corresponding error flag is transmitted to the DEFC on the SENT bus.	Reductant UTLC temperature measurement	> 90°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT communication fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Tank Temperature Sensor B Circuit Intermittent/Erratic	P2ADD	This monitor checks if the UTLC temperature signal is erratic. A fail is detected when the change in temperature between two samples is greater than expected.	ABS[secondary device temperature sensor signal(t) - secondary device temperature sensor signal (t - 1.3s)]	> 8°C/1.3s	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No SENT communication fault No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	3.9 s Failure out of 3 samples Time basis = 1.3s	Type A, 1 Trip
Reductant Pump Low Current	P2C11	This monitoring checks if the reductant pump motor output driver current is below the minimum operating limit current. Calibrateable under-current thresholds are defined for both pumping and heating modes. The pump can be controlled as a heater to increase frozen DEF defrost performance. Otherwise, the reductant pump motor will spin to move fluid into the reductant supply line at the desired pressure setpoint.	<u>If Pump Mode = Heating:</u> Reducant pump motor current <u>Else if (Pump State = Priming OR Run):</u> Reducant pump motor current	 < 0.75A < 0.5A	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] Pump State Reductant Pressure Sensor Measurement Pump hardware protection <u>Note1:</u> The pump will be stopped and this monitor will be disabled when pump state is set to Off in response to a fault on the: Pressure Sensor fault Reductant Pump fault Pressure Sensor power supply fault CAN communication fault Hardwired Run/Crank No DCU internal fault <u>Note2</u>: To obtain clear understanding of various pump states & transitions, refer to the "Pump States & Transitions" sheet.	= ACTIVE = ACTIVE = ACTIVE = Pump Heating, OR = Priming, OR = Buildup, OR = Closed Loop Control > 250 kPa = NOT ACTIVE P204B & P204C & P204D & P204E P208B & P20E8 & P20E9 & P149F & P214E & P208D & P208C & P208A & P249C P10CA & P10C9 P10C6 & U2626 & U2412 P10DA & P10DB P20FF & P10F4	4 s Failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1 Trip
Reductant Control Module Powertrain Sensor Bus Off	U2412	The diagnostic monitor detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Sensor bus CAN transmitter transmission errors count <u>Note:</u> The BusOff state is defined by the CAN controller hardware per ISO 11898	> 255	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.09s Failure out of 9 samples Time basis = 0.01s	Type A, 1 Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Lost Communication With Engine Control Module on Powertrain Sensor CAN Bus	U2626	This monitoring shall check supervised messages from the ECM for communication status. If the DEFC has not received the message for 5 seconds, then this fault shall be set.	Time whenever any CAN1 ($1E2) message has not been received by DEFC OR	> 0.035s	Sensor Bus Wake Up No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 10 to 200 samples Diagnostic checks every received message (0.025s, 0.1s or 0.5s). Depends on CAN message transmit time.	Type A, 1 Trip
			Time whenever any CAN2 ($2C6) message has not been received by DEFC OR	> 0.11s				
			Time whenever any CAN3 ($2F7) message has not been received by DEFC OR	> 0.11s				
			Time whenever any CAN4 ($4CA) message has not been received by DEFC	> 0.51s				
Reductant Control Module Lost Communication with Reductant Level Sensor	U2627	This monitoring checks if Reductant Control Module is able to detect UTLC Sensor Lost Communication diagnostic failure modes described in SAE "J2716 - SENT: Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses OR	< 42 clock ticks > 70 clock ticks > 15 < 0 +/- 1/64 TRUE TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1 Trip
		This monitoring checks if Reductant Control Module is able to detect UTLC Sensor SENT messages nibble counter values are in expected sequence of messages.	Nibble2: Application Counter pattern	* {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1.26 s Failure out of 42 samples Time basis = 0.03s	
Reductant Control Module Lost Communication with Reductant Concentration Sensor	U2628	This monitoring checks if Reductant Control Module is able to detect UTLC Sensor Lost Communication diagnostic failure modes described in SAE "J2716 - SENT: Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses OR	< 42 clock ticks > 70 clock ticks > 15 < 0 +/- 1/64 TRUE TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1 Trip
		This monitoring checks if Reductant Control Module is able to detect UTLC Sensor SENT messages nibble counter values are in expected sequence of messages.	Nibble2: Application Counter pattern	* {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1.26 s Failure out of 42 samples Time basis = 0.03s	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Control Module Lost Communication with Reductant Tank Temperature Sensor 2	U2630	This monitoring checks if Reductant Control Module is able to detect UTLC Sensor Lost Communication diagnostic failure modes described in SAE "J2716 - SENT: Single Edge Nibble Transmission for Automotive Applications, Section 5.3.3 Received Messages Diagnostics".	Calibration pulse length Calibration pulse length Nibble value Nibble value Successive calibrations pulses differ by Cheksum error Not the expect number of falling edges between calibration pulses OR	< 42 clock ticks > 70 clock ticks > 15 < 0 +/- 1/64 TRUE TRUE	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up] No DCU internal fault	= ACTIVE = ACTIVE = ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, 1 Trip
		This monitoring checks if Reductant Control Module is able to detect UTLC Sensor SENT messages nibble counter values are in expected sequence of messages.	Nibble2: Application Counter pattern	* {0;1;0;2;0;3;0;4;0;5;0;6;0;7}			1.26 s Failure out of 42 samples Time basis = 0.03s	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reductant Heater 1 Temperature Response Matured Diagnostic	P2D45	This monitoring checks if measured average reductant temperature is deviating from the Reductant Control Module computed estimation of limit part temprature. Reductant Control Module estimates limit acceptable part (WPA) & non-functional heater (BPU) temperatures based on heaters power & external conditions (ambient temperature, tank temperature, and other noise factors such as slosh & wind) in case of tank heaters activation request.	Average temperature - WPA temperature Note: See "Reductant Temperature Too Low" sheet for parameters description and values	≥ 0.1°C	[Sensor Bus Wake Up OR Accessory Wake Up OR Run/Crank Wake Up]	= ACTIVE = ACTIVE = ACTIVE	Time basis = 600s One decision per driving cycle Recovery only at next driving cycle	Type B, 2 Trips
					Temperature sensor initilization (waiting timer)	≥ 150s		
					Temperature sensor validity	= TRUE		
					Secondary temperature sensor validity	= TRUE		
					Ambiant air temperature validity	= TRUE		
					Ambient temperature variation range during trip	< 20°C		
					Vehicule engine off time	≥ 28,800s		
					Refill/Draining Monitoring status set this driving cycle	= FALSE		
					Initial absolute difference between ambient temperature and average temperature	< 30°C		
					Initial absolute difference between average temperature and average loss temperature	< 5°C		
					Average temperature	≤-14°C & ≥-40°C		
					Estimated DEF Level	> 5L		
					[Tank heater 1 PWM command OR Tank heater 2 PWM command]	≥ 10W ≥ 10W		
					WPA temperature - BPU temperature	≥ 2°C		
					No DCU internal fault	P20FF & P10F4 & P10DA & P10DB		
					Note: Tank heaters power command are force to zero if:			
					Tank Temperature Sensor fault	P205B & P205C & P205D & P205E		
					Tank Temperature power supply fault	P131B & P131C		
					Heater 1 fault	P214F & P20BA & P20BB & P20BC & P20B9 & P10D9 & P21DD		
					Heater 2 fault	P221C & P221D & P20C0 & P20BE & P20BF & P20BD & P10F3		
					Heater 3 fault	P221E & P221F & P20C1 & P20C2 & P20C3 & P20C4 & P143C		
					Heater power supply fault	P10DC & P10DD		
					CAN communication fault	P10C6 & U2626 & U2412		

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_OPEN_FRONT_LEFT	C0502	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris ASIC sets FL Open Sensor bit = TRUE when High side current < 3.5mA	Polaris ASIC Open Sensor Bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_OPEN_FRONT_RIGHT	C0508	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris ASIC sets FR Open Sensor bit = TRUE when High side current < 3.5mA	Polaris ASIC Open Sensor Bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSSOPENREARLEFT	C050E	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris ASIC sets RL Open Sensor bit = TRUE when High side current < 3.5mA	Polaris ASIC Open Sensor Bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_OPEN_REAR_RIGHT	C0514	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris ASIC sets RR Open Sensor bit = TRUE when High side current < 3.5mA	Polaris ASIC Open Sensor Bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_FRONT_LEFT	C0503	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	High side over current bit= True OR High side short to battery bit= True OR Low side over current bit= True OR Low side short to ground bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_SHORT_FRONT_RIGHT	C0509	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	High side over current bit= True OR High side short to battery bit= True OR Low side over current bit= True OR Low side short to ground bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_REAR_LEFT	C050F	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	High side over current bit= True OR High side short to battery bit= True OR Low side over current bit= True OR Low side short to ground bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_SHORT_REAR_RIGHT	C0515	This monitor checks if: • HS Shorted to Battery • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX HS OC = TRUE when High side current > 40mA	High side over current bit= True OR High side short to battery bit= True OR Low side over current bit= True OR Low side short to ground bit= True	• Wheel speed sensor supply is enabled	100 ms	Type A. MIL Illumination.
WSS_LS_SHORT_TO_GND_FRONT_LEFT	C0502	This monitor checks if: • LS Shorted to Ground • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.
WSS_LS_SHORT_TO_GND_FRONT_RIGHT	C0508	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_LS_SHORT_TO_GND_REAR_LEFT	C050E	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.
WSS_LS_SHORT_TO_GND_REAR_RIGHT	C0514	This monitor checks if: • LS Shorted to Battery • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Polaris Asic sets XX LS SHORT TO GROUND spi bit= TRUE	• Wheel speed sensor supply is enabled • Tested only during power up or after clear DTC.	100 ms	Type A. MIL Illumination.
WSS_MISSING_FRONT_LEFT	C0505	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec Fault maturation time for two Wss missing: a. ABS or MOCO active: 15 sec b. If ABS or MOCO not active: 1. If undriven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec. 2. If driven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 10 sec. If velocity is less than 50 km/hr then fault maturation is: 30 sec. Fault maturation time for three Wss missing: 120 sec	If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased.	• Wheel speed sensor supply is enabled. • No Ohmic wheel speed sensor failure present. • No Wss Erratic or Wss Dropout fault present • At least one WSS > 6kph • No excessive high or low voltage • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	3-1 20s depending on number of missing wss and situation	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_MISSING_FRONT_RIGHT	C050B	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec Fault maturation time for two Wss missing: a. ABS or MOCO active: 15 sec b. If ABS or MOCO not active: 1. If undriven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec. 2. If driven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 10 sec. If velocity is less than 50 km/hr then fault maturation is: 30 sec. Fault maturation time for three Wss missing: 120 sec	If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased.	• Wheel speed sensor supply is enabled. • No Ohmic wheel speed sensor failure present. • No Wss Erratic or Wss Dropout fault present • At least one WSS > 6kph • No excessive high or low voltage • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	3-120s depending on number of missing wss and situation	Type B. MIL Illumination.
WSS_MISSING_REAR_LEFT	C0511	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) While the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec Fault maturation time for two Wss missing: a. ABS or MOCO active: 15 sec b. If ABS or MOCO not active: 1. If undriven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec. 2. If driven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 10 sec. If velocity is less than 50 km/hr then fault maturation is: 30 sec. Fault maturation time for three Wss missing: 120 sec	If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased.	• Wheel speed sensor supply is enabled. • No Ohmic wheel speed sensor failure present. • No Wss Erratic or Wss Dropout fault present • At least one WSS > 6kph • No excessive high or low voltage • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	3-120s depending on number of missing wss and situation	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_MISSING_REAR_RIGHT	C0517	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	Missing Wheel Speed Sensor If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undroven wheel speed is greater than 6km/h, the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during TC, ABS or MOCO then the detection is run and the detection time is increased. The failsafe will not run in case • exactly one axle is moving (other axle is standstill) while the moving axle shows an average velocity of less than 10km/h (to prevent setting Missing Wss faults on a roller bench). • the dynamic failsafe is currently disabled because the system is currently in Diagnostic mode. Counter type: Counter up and the fault counter reset If all sensors show a speed greater than 6 km/h or the vehicle is in standstill (all sensors lower than 1.5 km/h) Fault maturation time for one Wss missing: a. TC active: 60 sec b. ABS or MOCO not active: 3 sec. c. ABS or MOCO active: 15 sec Fault maturation time for two Wss missing: a. ABS or MOCO active: 15 sec b. If ABS or MOCO not active: 1. If undriven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 3 sec. If velocity is less than 50 km/hr then fault maturation is: 10 sec. 2. If driven wheel is moving then: Fault maturation if velocity greater than 50 km/hr: 10 sec. If velocity is less than 50 km/hr then fault maturation is: 30 sec. Fault maturation time for three Wss missing: 120 sec	If one sensor shows a speed of less than 1.5 km/h (standstill detection threshold) while the other sensors indicate a speed greater than 6 km/h, then a missing sensor signal fault occurs. The detection is dependant on the speed of the wheels showing a valid signal. If the average speed of moving wheel (6km/h) is greater than 50 km/h and/or any undriven wheel speed is greater than 6km/h the fault detection time is faster. The entire test sequence is bypassed whenever unexpected wheel acceleration is detected to induce ABS (DRP) activation. The purpose of this handling is to avoid erroneous fault detection. Special case is during ABS, only if the wheel is in pressure dump state, then the detection is run and the detection time is increased.	• Wheel speed sensor supply is enabled. • No Ohmic wheel speed sensor failure present. • No Wss Erratic or Wss Dropout fault present • At least one WSS > 6kph • No excessive high or low voltage • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	3-1 20s depending on number of missing wss and situation	Type B. MIL Illumination.
WSS_ERRATIC_FRONT_LEFT	C0504	This monitor checks if: • Wheel speed sensor not mounted correctly. • Missing tooth or teeth on the wheel speed sensor tone-ring. • Electro-magnetic interference (EMI).	Erratic Wheel Speed Sensor • If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set. • If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault. ▪Counter: 1000 ▪Monitor Rate: 5ms ▪Fault maturation time (Goal): 200ms	|Wheel_Accel| > 491 m/s^2	• reference_vehicle_velocity > 3.58 m/s • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	Goal: 40000 Continuous failure Time: 200ms	Type A. MIL Illumination.
WSSERRATICFRONTRIGHT	C050A	This monitor checks if: • Wheel speed sensor not mounted correctly. • Missing tooth or teeth on the wheel speed sensor tone-ring. • Electro-magnetic interference (EMI).	Erratic Wheel Speed Sensor • If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set. • If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault. ▪Counter: 1000 - Monitor Rate: 5ms ▪Fault maturation time (Goal): 200ms	|Wheel_Accel| > 491 m/s^2	• reference_vehicle_velocity > 3.58 m/s • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	Goal: 40000 Continuous failure Time: 200ms	Type A. MIL Illumination.
WSSERRATICREARLEFT	C0510	This monitor checks if: • Wheel speed sensor not mounted correctly. • Missing tooth or teeth on the wheel speed sensor tone-ring. • Electro-magnetic interference (EMI).	Erratic Wheel Speed Sensor • If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set. • If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault. ▪Counter: 1000 ▪Monitor Rate: 5ms ▪Fault maturation time (Goal): 200ms	|Wheel_Accel| > 491 m/s^2	• reference_vehicle_velocity > 3.58 m/s • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	Goal: 40000 Continuous failure Time: 200ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_ERRATIC_REAR_RIGHT	C0516	This monitor checks if: • Wheel speed sensor not mounted correctly. • Missing tooth or teeth on the wheel speed sensor tone-ring. • Electro-magnetic interference (EMI).	Erratic Wheel Speed Sensor • If the absolute value of the unfiltered wheel acceleration is greater than 491 m/s/s and the wheel or vehicle speed is above 3.58 m/s, an erratic wheel speed sensor may be present. The fault occurrence counter will be incremented by "Fault Maturation Weight". If the fault occurrence counter reaches "Fault Goal", then an erratic wheel speed sensor fault is set. • If the wheel acceleration is less than or equal to the above threshold, then the fault occurrence counter is decremented by monitor rate. This allows the system to slowly decay the fault occurrence counter so that only a very erratic wheel speed sensor with unrealistic acceleration values will set this fault. ■Counter: 1000 ■Monitor Rate: 5ms - Fault maturation time (Goal): 200ms	|Wheel_Accel| > 491 m/s^2	• reference_vehicle_velocity > 3.58 m/s • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	Goal: 40000 Continuous failure Time: 200ms	Type A. MIL Illumination.
WSS_DROPOUT_FRONT_LEFT	C0505	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type B. MIL Illumination.
WSS_DROPOUT_FRONT_RIGHT	C050B	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_DROPOUT_REAR_LEFT	C0511	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type B. MIL Illumination.
WSSDROPOUTREARRIGHT	C0517	This monitor checks if: • Defective wheel speed sensor. • Wheel speed sensor not mounted correctly. • Defective wheel speed sensor wiring harness. • Missing tooth or teeth on the wheel speed sensor tone-ring.	• Wheel Speed Sensor Dropout • When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. • Once the timer decays to zero (or is already zero), the wheel speed sensor dropout monitor checks if any wheel speed sensor edges have been detected. If wheel speed sensor edges have been detected then we check if the wheel velocity is greater than 0.2236 m/s. If it is then we can pass this failsafe. If not we reset the fault monitor because we can not monitor this fault condition at this time. • If no wheel speed sensor edges have been detected for more than 150ms while the last valid wheel velocity (which was calculated based on real speed edges) was greater than 30km/h a WSS Dropout fault will be detected. Furthermore the filtered vehicle velocity must be greater than 3.58m/s to detect the fault. • Counter: Count 1-up • Monitor Rate: 7ms	When wheel speed sensor acceleration is detected that is above 392 m/s/s, a timer is initialized to hold off wheel speed sensor dropout detection for 1000 msec. Once this sudden acceleration is detected (and the timer is greater than zero), subsequent accelerations/decelerations greater than 294 m/s/s will reset the timer to the greater of the current timer value or 500 msec. This is done to prevent setting a fault during subsequent performance activity. If no wheel speed sensor edges have been detected then we see which axle the wheel is on because there can be different wheel speed thresholds. We also check if the brake pedal is applied. Wheels can decelerate much faster when the brake pedal is applied than when it is not applied so the brake pedal is used to determine the speed threshold at which the sensor dropout monitor can be executed. If the brake pedal is applied, a higher wheel speed threshold is used than when the brake pedal is not applied. If the brake pedal is applied the wheel speed sensor velocity threshold is 9 m/s for wheels on the front axle and 9 m/s for wheels on the back axle. If the brake pedal is not applied then the wheel speed sensor velocity threshold is 5.38 m/s for wheels on the front axle and 5.38 m/s for wheels on the back axle. If the last valid wheel velocity is greater than the wheel speed velocity threshold set above, the difference in time from the last time we checked for this fault is greater than 40 msec, and the filtered vehicle velocity is above 3.58 m/s then a wheel speed sensor dropout fault is detected. If any of these conditions are not true then conditions are not correct to do dropout detection so reset the fault monitor.	• Wheel speed sensor supply is enabled. • No ohmic wheel speed sensor failure present • Diagnostic Mode Inactive • Emissions Rolls Test Inactive	40 ms	Type B. MIL Illumination.
WSS_FAST_M 1SSI NG_FRONT_LE FT	C0505	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	• Fast Missing Wheel Speed Sensor ■ This failsafe is only active from • Ignition On until the vehicle reaches • 15km/h for the first time. • During this time the wheel speeds and wheel • speed pulses are monitored	The wheel speed monitor starts at velocities above 4km/h. If a wheel speed sensor shows a velocity slower than 1,2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented. At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not. The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h. If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code.	• Wheel speed sensor supply is enabled. • No other wheel speed sensor failure present • 15 km/h not reached this ignition cycle • Diagnostic Mode Inactive • Emissions Rolls Test Inactive SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched	1 count	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_FAST_MISSING_FRONT_RIGHT	C050B	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	• Fast Missing Wheel Speed Sensor • This failsafe is only active from • Ignition On until the vehicle reaches • 15km/h for the first time. • During this time the wheel speeds and wheel • speed pulses are monitored	The wheel speed monitor starts at velocities above 4km/h. If a wheel speed sensor shows a velocity slower than 1.2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented. At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not. The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h. If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code.	• Wheel speed sensor supply is enabled. • No other wheel speed sensor failure present • 15 km/h not reached this ignition cycle • Diagnostic Mode Inactive • Emissions Rolls Test Inactive SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched	1 count	Type B. MIL Illumination.
WSS_FAST_MISSING_REAR_LEFT	C0511	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring. (should come from FMEA)	• Fast Missing Wheel Speed Sensor • This failsafe is only active from • Ignition On until the vehicle reaches • 15km/h for the first time. • During this time the wheel speeds and wheel • speed pulses are monitored	The wheel speed monitor starts at velocities above 4km/h. If a wheel speed sensor shows a velocity slower than 1,2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented. At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not. The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h. If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code.	• Wheel speed sensor supply is enabled. • No other wheel speed sensor failure present • 15 km/h not reached this ignition cycle • Diagnostic Mode Inactive • Emissions Rolls Test Inactive SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched	1 count	Type B. MIL Illumination.
WSS_FAST_MISSING_REAR_RIGHT	C0517	This monitor checks if: • Wheel speed sensor not mounted correctly. • Wheel speed sensor to tone-ring gap out of tolerance. • Demagnetized tone-ring.	• Fast Missing Wheel Speed Sensor • This failsafe is only active from • Ignition On until the vehicle reaches • 15km/h for the first time. • During this time the wheel speeds and wheel • speed pulses are monitored	The wheel speed monitor starts at velocities above 4km/h. If a wheel speed sensor shows a velocity slower than 1,2km/h the wheel speed is considered to be missing and corresponding internal fault counter of the failsafe will be incremented. At the time the vehicle reaches 15km/h, these fault counters and the wheel speed pulse counters are used to decide whether a fault has to be latched or not. The failsafe will only latch a fault if only one wheel speed signal seems to be missing. If more than one wheel speed signal is missing, no fault will be latched by this failsafe because this is not required to be detected until 15km/h. If a fast missing fault has been detected the failsafe monitors the conditions until either the failure condition disappears for enough time to remove the fault code or the fault can be removed in case it has been confirmed by another wss fault code.	• Wheel speed sensor supply is enabled. • No other wheel speed sensor failure present • 15 km/h not reached this ignition cycle • Diagnostic Mode Inactive • Emissions Rolls Test Inactive SYSTEM_VOLTAGE_EXCESSIVE_LOW not latched	1 count	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_TOO_FAST_SENSOR_FRONT_LEFT	C0505	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type B. MIL Illumination.
WSS_TOO_FAST_SENSOR_FRONT_RIGHT	C050B	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type B. MIL Illumination.
WSS_TOO_FAST_SENSOR_REAR_LEFT	C0511	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type B. MIL Illumination.
WSS_TOO_FAST_SENSOR_REAR_RIGHT	C0517	This monitor checks if: - Wheel speed sensor not mounted correctly. - Wheel speed sensor to tone-ring gap out of tolerance. - Demagnitized tone-ring	If this wheelspeed sensor reaches a speed over 3.73mph (6 km/h) while the other three show a speed of less than 0.93mph (1.5 km/h) the fault is detected.	If fault detection criteria is fulfilled then WSS_TOO_FAST_SENSOR_XX will latch if WSS_MISSING_XX or WSS_FAST_MISSING_XX or WSS_DROPOUT_XX faults are not latched.	• No electrical failure is currently present	40 msec	Type B. MIL Illumination.
WSS_SHADOWZONE_FRONT_LEFT	C0501	This monitor checks if: • High resistance of wiring harness • High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current)	• Detection is handled by the Polaris ASIC	Polaris ASIC Low Grey Zone Detect bit - True (The low grey zone is 7 to 14mA) or Polaris ASIC High Grey Zone Detect bit = True (The high grey zone is 14 to 28mA)	• No electrical failure is currently present	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_SHADOWZONE_FRONT_RIGHT	C0507	This monitor checks if: • High resistance of wiring harness • High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current)	• Detection is handled by the Polaris ASIC	Polaris ASIC Low Grey Zone Detect bit = True (The low grey zone is 7 to 14mA) or Polaris ASIC High Grey Zone Detect bit - True (The high grey zone is 14 to 28mA)	• No electrical failure is currently present	100 ms	Type A. MIL Illumination.
WSS_SHADOWZONE_REAR_LEFT	C050D	This monitor checks if: • High resistance of wiring harness • High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current)	• Detection is handled by the Polaris ASIC	Polaris ASIC Low Grey Zone Detect bit = True (The low grey zone is 7 to 14mA) or Polaris ASIC High Grey Zone Detect bit = True (The high grey zone is 14 to 28mA)	• No electrical failure is currently present	100 ms	Type A. MIL Illumination.
WSS_SHADOWZONE_REAR_RIGHT	C0513	This monitor checks if: • High resistance of wiring harness • High side wheel speed sensor supply shorted to battery voltage with a resistance (leakage current)	• Detection is handled by the Polaris ASIC	Polaris ASIC Low Grey Zone Detect bit = True (The low grey zone is 7 to 14mA) or Polaris ASIC High Grey Zone Detect bit = True (The high grey zone is 14 to 28mA)	• No electrical failure is currently present	100 ms	Type A. MIL Illumination.
WSS_HS_OC_FRONT_LEFT	C0503	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets HS Over Current = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSS_HS_OC_FRONT_RIGHT	C0509	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_HS_OC_REAR_LEFT	C050F	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSS_HS_OC_REAR_RIGHT	C0515	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC sets any of these bits = TRUE	Polaris ASIC sets any of these bits = TRUE High Side Over Current (HS current > 40mA)	• Wheel speed sensor supply is enabled. • High Side failsafe is not blocked	100 msec	Type A. MIL Illumination.
WSS_UNDER_VOLTAGE_FRONT_LEFT	P0562	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Detection is handled by the Polaris ASIC	Polaris ASIC sets WSS Undervoltage disable bit = TRUE Note: This bit will activate when Battery voltage drops below 5.6 V	• Wheel speed sensor supply is enabled • No voltage DTCs are set	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
WSS_UNDER_VOLTAGE_FRONT_RIGHT	P0562	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Detection is handled by the Polaris ASIC	Polaris ASIC sets WSS Undervoltage disable bit = TRUE Note: This bit will activate when Battery voltage drops below 5.6 V	• Wheel speed sensor supply is enabled • No voltage DTCs are set	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
WSS_UNDER_VOLTAGE_REAR_LEFT	P0562	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Detection is handled by the Polaris ASIC	Polaris ASIC sets WSS Undervoltage disable bit = TRUE Note: This bit will activate when Battery voltage drops below 5.6 V	• Wheel speed sensor supply is enabled • No voltage DTCs are set	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_UNDER_VOLTAGE_REAR_RIGHT	P0562	This monitor checks if: • Defective wheel speed sensor • Defective wire harness to wheel speed sensor • Defective printed circuit board • Defective Polaris ASIC	• Detection is handled by the Polaris ASIC	Polaris ASIC sets WSS Undervoltage disable bit = TRUE Note: This bit will activate when Battery voltage drops below 5.6 V	• Wheel speed sensor supply is enabled • No voltage DTCs are set	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
ASIC_DECODE_THREE_LEVEL_FAULT_LF	C0555	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_LF	C0501	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	Set fault if time between stand still pulse if > 390 ms	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_LF	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_DECODE_THREE_LEVEL_FAULT_RF	C0556	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ASIC_THREE_LEVEL_DATA_READ_FAULT_RF	C0507	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	Set fault if time between stand still pulse if > 390 ms	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_RF	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_DECODE_THREE_LEVEL_FAULT_LR	C0557	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_LR	C050D	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	Set fault if time between stand still pulse if > 390 ms	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_LR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ASIC_DECODE_THREE_LEVEL_FAULT_RR	C0558	This monitor checks if: • wrong vehicle config file used • misbuild using wrong WSS	Look for ASIC decoding a three level sensor when a two level sensor is configured: Check for the number of VDA bits received indicates that the ASIC is decoding for a three level sensor or Check for the tp out of range bit received indicates that the ASIC is decoding for a three level sensor	While a wheelspeed channel is expected to be configured for a 2-level sensor (i.e. decode modes 1 or 2), the MCU shall monitor the tp Out of Range and VDA Bit Counter SPI bits. If these bits are not zero, the MCU shall detect that the ASIC is incorrectly decoding in mode 3.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_THREE_LEVEL_DATA_READ_FAULT_RR	C0513	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the VDA Data, VDA Bit Counter, Standstill, and tp Out of Range SPI fields, the ASIC shall also set the Data Read SPI flag.	Set fault if time between stand still pulse if > 390 ms	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ASIC_TWO_LEVEL_DATA_READ_FAULT_RR	P0606	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	• When the ASIC updates the PWM Pulse Width and Standstill SPI register fields, the ASIC shall also set the Data Read SPI flag.	The MCU shall monitor each wheel's Data Read SPI flag, and verify that the bit is set after every sensor falling edge.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
WSS_3L_INFO_MISSING_FRONT_LEFT	C0555	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	250 msec	Type A. MIL Illumination.
WSS_3L_INFO_MISSING_FRONT_RIGHT	C0556	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	250 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_3L_INFO_MISSING_REAR_LEFT	C0557	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	250 msec	Type A. MIL Illumination.
WSS_3L_INFO_MISSING_REAR_RIGHT	C0558	This monitor checks if: • Defective system ASIC ASIC data read flag is not updated properly	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long.	Monitors if an intelligent 3-level wss doesn't send pulses (standstill or wheel speed pulses) for too long. Furthermore it checks the number of received data bits in the transmission. If less than the minimum number of data bits (3) are received, a fault will be latched.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled • No WSS electrical fault is present • SYSTEM_VOLTAGE_EXCESSIVE_LOW fault is not present	250 msec	Type A. MIL Illumination.
WSS_PARITY_FRONT_LEFT	C0555	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 airgap (1=too large) 1 mode state (1=initial mode, 0=active mode) 2 digital input state (1=input voltage low) 3 validity direction recognition (1=direction bit is valid) 4 direction recognition (1=direction positive (forward driving)) 5-7 sensing distance bits (air gap) (Bit 5 is LSB, 7 MSB) (8) parity (1=even parity)	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	35 msec	Type A. MIL Illumination.
WSS_PARITY_FRONT_RIGHT	C0556	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 airgap (1=too large) 1 mode state (1=initial mode, 0=active mode) 2 digital input state (1=input voltage low) 3 validity direction recognition (1=direction bit is valid) 4 direction recognition (1=direction positive (forward driving)) 5-7 sensing distance bits (air gap) (Bit 5 is LSB, 7 MSB) (8) parity (1=even parity)	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	35 msec	Type A. MIL Illumination.
WSS_PARITY_REAR_LEFT	C0557	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 airgap (1=too large) 1 mode state (1=initial mode, 0=active mode) 2 digital input state (1=input voltage low) 3 validity direction recognition (1=direction bit is valid) 4 direction recognition (1=direction positive (forward driving)) 5-7 sensing distance bits (air gap) (Bit 5 is LSB, 7 MSB) (8) parity (1=even parity)	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	35 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_PARITY_REAR_RIGHT	C0558	This monitor checks if: VDA data bits are corrupted	Decodes the additional information of a Philips KMI22/1 wheelspeed sensor which is a 3-level VDA compliant sensor.	It's a VDA compliant Philips KMI22/1 sensor so use the following mask for the data bits: 0 airgap (1=too large) 1 mode state (1=initial mode, 0=active mode) 2 digital input state (1=input voltage low) 3 validity direction recognition (1=direction bit is valid) 4 direction recognition (1=direction positive (forward driving)) 5-7 sensing distance bits (air gap) (Bit 5 is LSB, 7 MSB) (8) parity (1=even parity) The even parity flag should be the same as the calculated even parity. Else, it indicates that atleast one data bit is corrupted.	• Polaris is initialized. • Wheel Speed Sensor supply is enabled	35 msec	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_FRONT_LEFT	C0501	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized • Wheel speed edge or stand still pulse received	15 msec -375ms	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_FRONT_RIGHT	C0507	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized • Wheel speed edge or stand still pulse received	15 msec -375ms	Type A. MIL Illumination.
WSS_VDA_TP_OUT_OF_RANGE_REAR_LEFT	C050D	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized • Wheel speed edge or stand still pulse received	15 msec -375ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_VDA_TP_OUT_OF_RANGE_REAR_RIGHT	C0513	This monitor checks if: • standstill pulse width out of range • Defective system ASIC	• The ASIC shall measure the width of each speed pulse or speed replacement pulse (tp). If tp is less than tp minimum threshold or greater than tp maximum threshold, the ASIC shall set the tp Out of Range SPI flag.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse width is out of range (error bit equals 1) (3 level WSS only)	• Polaris is initialized • Wheel speed edge or stand still pulse received	15 msec -375ms	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_FRONT_LEFT	C0501	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 -475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_FRONT_LEFT	C0501	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 -5100ms.	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_FRONT_RIGHT	C0507	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 -475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_FRONT_RIGHT	C0507	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 -5100ms.	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_STANDSTILL_FAST_REAR_LEFT	C050D	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_REAR_LEFT	C050D	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 -5100ms.	Type A. MIL Illumination.
WSS_STANDSTILL_FAST_REAR_RIGHT	C0513	This monitor checks if: • Defective system ASIC Standstill VDA transmission too short	• The MCU shall detect if standstill pulses occur faster than every 95ms, for 5 consecutive standstill pulses.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too short - less than 105 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and detection rules. Range is from 25 - 475ms.	Type A. MIL Illumination.
WSS_STANDSTILL_SLOW_REAR_RIGHT	C0513	This monitor checks if: • Defective system ASIC • Standstill VDA transmission too long	• The MCU shall detect if standstill pulses occur slower than every 205ms, or no standstill pulse at all for 1025ms.	POLARIS ASIC sends diagnostic information indicating that the standstill pulse transmission is too long - more than 195 msec (3 level WSS only)	• Polaris is initialized	Variable. See Fault Equation and Detection Rules. Range is from 1025 -5100ms.	Type A. MIL Illumination.
SYS_ASIC_WSS_EDGE_MISMATCH_LF	P0606	This monitor checks if: • Nominal cause: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault • ASIC outputs shorted to neighboring pins • Open trace on circuit board • Defective system ASIC	The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation.	1) The micro monitors the number of edges received every loop for plausability (less than a max number). 2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match.	• Polaris is initialized • No other ASIC faults detected	25 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_WSS_EDGE_MISMATCH_RF	P0606	This monitor checks if: • Nominal cause: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault • ASIC outputs shorted to neighboring pins • Open trace on circuit board • Defective system ASIC	The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation.	1) The micro monitors the number of edges received every loop for plausability (less than a max number). 2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match.	• Polaris is initialized • No other ASIC faults detected	25 msec	Type A. MIL Illumination.
SYS_ASIC_WSS_EDGE_MISMATCH_LR	P0606	This monitor checks if: • Nominal cause: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault • ASIC outputs shorted to neighboring pins • Open trace on circuit board • Defective system ASIC	The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation.	1) The micro monitors the number of edges received every loop for plausability (less than a max number). 2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match.	• Polaris is initialized • No other ASIC faults detected	25 msec	Type A. MIL Illumination.
SYS_ASIC_WSS_EDGE_MISMATCH_RR	P0606	This monitor checks if: • Nominal cause: Resistive short in the wheelspeed sensor wiring other possible causes Wheel Speed Sensor fault • ASIC outputs shorted to neighboring pins • Open trace on circuit board • Defective system ASIC	The Wheel Speed signal generated by the ASIC and the one received by the main Micro should match to insure correct wheel speed calculation.	1) The micro monitors the number of edges received every loop for plausability (less than a max number). 2) The micro will compare the edges detected by the internal timer with the SPI flags sent by the ASIC to make sure they match.	• Polaris is initialized • No other ASIC faults detected	25 msec	Type A. MIL Illumination.
MCU_WSS_EXCESSIVE_EDGES_DETECTED_FRONT_LEFT	C0504	This monitor checks if: • Defective system ASIC • Defective wheel speed sensor	This fault is latched when the edge counts exceeds the threshold.	Excessive Edge counts > 55	• Wheel speed sensor supply is enabled	25 msec	Type A. MIL Illumination.
MCU_WSS_EXCESSIVE_EDGES_DETECTED_FRONT_RIGHT	C050A	This monitor checks if: • Defective system ASIC • Defective wheel speed sensor	This fault is latched when the edge counts exceeds the threshold.	Excessive Edge counts > 55	• Wheel speed sensor supply is enabled	25 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MCU_WSS_EXCESSIVE_EDGES_DETECTED_REAR_LEFT	C0510	This monitor checks if: • Defective system ASIC • Defective wheel speed sensor	This fault is latched when the edge counts exceeds the threshold.	Excessive Edge counts > 55	• Wheel speed sensor supply is enabled	25 msec	Type A. MIL Illumination.
MCU_WSS_EXCESSIVE_EDGES_DETECTED_REAR_RIGHT	C0516	This monitor checks if: • Defective system ASIC • Defective wheel speed sensor	This fault is latched when the edge counts exceeds the threshold.	Excessive Edge counts > 55	• Wheel speed sensor supply is enabled	25 msec	Type A. MIL Illumination.
WSS_TYPE_MISMATCH_FRONT_LEFT	C0555	This monitor checks if: • Incorrect WSS installed (Non-Directional or Infineon sensor)	• Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonIntelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still pulses take 737 ms and for each puse the probablity counter increments by 3. Therefore it takes about ((30\3)*737 ms= 7.37 seconds) to detect.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	Goal = 1 count Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected.	Type A. MIL Illumination.
WSS_TYPE_MISMATCH_FRONT_RIGHT	C0556	This monitor checks if: • Incorrect WSS installed (Non-Directional or Infineon sensor)	• Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonIntelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still pulses take 737 ms and for each puse the probablity counter increments by 3. Therefore it takes about ((30\3)*737 ms= 7.37 seconds) to detect.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	Goal = 1 count Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected.	Type A. MIL Illumination.
WSS_TYPE_MISMATCH_REAR_LEFT	C0557	This monitor checks if: • Incorrect WSS installed (Non-Directional or Infineon sensor)	• Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonIntelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still pulses take 737 ms and for each puse the probablity counter increments by 3. Therefore it takes about ((30\3)*737 ms= 7.37 seconds) to detect.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	Goal = 1 count Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected.	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_TYPE_MISMATCH_REAR_RIGHT	C0558	This monitor checks if: • Incorrect WSS installed (Non-Directional or Infineon sensor)	• Probability counters are used to determine the likelihood of possible DWSS sensors. Therefore, no speed or time filtering is needed. Detection time depends on wheel speed. When the vehicle is at a stop, detection time is longest since no direction is transmitted (both sensor types look the same) and standstill pulses are used instead. At high-speeds, detection is shortest since missing or extra direction information will indicate the sensor installed. Looking for 30 speed pulses that match a particular wheel speed sensor type. Time depends on combination of expected wheel speed sensor and actual wheel speed sensor. Nominal calculations: Expecting 2 level nonIntelligent but have 3 level WSS (30*150 ms=4.5 sec). 2 level directional stand still pulses take 737 ms and for each puse the probablity counter increments by 3. Therefore it takes about ((30\3)*737 ms= 7.37 seconds) to detect.	Algorithm has detected that a directional WSS has incorrectly been installed	• WSS must be valid (supply enabled and no electrical problems)	Goal = 1 count Time = Depends on combination (about 4.5 sec if 3 level sensor installed and about 7.37 secs if 2 level with standstill sensor is installed for 2 level non intelligent sensor expected.	Type A. MIL Illumination.
SYS_ASIC_U_WS_OVER_VOLT	C05A3	This monitor checks if: • Defective system ASIC	If VU_WS exceeds the rising U_WS over-voltage detection threshold for the detection debounce time, the ASIC sets the U_WS Overvoltage Warning SPI flag and disable the four high-side switches.	The MCU shall configure the wheelspeed sensor overvoltage bypass configuration to LOW. If the WSS overvoltage warning bit is set, fault is set.	• Polaris is initialized	50 msec	Type A. MIL Illumination.
SYS_ASIC_WSS_SUPPLY_LOW	P0562	This monitor checks if: • Defective system ASIC	• Within the ASIC, the U_WS and U12 voltages shall be internally divided down and shall feed dedicated ADC channels.	The MCU shall read the ASIC's U_WS Voltage Result SPI field and verify that "sufficient voltage" is present for wheelspeed operation. For ECUs with no U_WS voltage regulation: the MCU shall also read the ASIC's U12 Voltage Result SPI field and perform a plausibility check between U_WS and U12. Note: sufficient voltage for wheelspeed operation depends upon the type of wheelspeed sensor used.	• Polaris is initialized	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
WSS_OVER_TEMP_WARNING	P0606	This monitor checks if: • Defective system ASIC • internal overheating	• MCU shall monitor the U_WS OverTemp Warning SPI flag received from the ASIC	MCU detects that the U_WS OverTemp Warning SPI flag received from the ASIC is TRUE	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYSASICWSSHSSTUCKON	C05A3	This monitor checks if: • Defective system ASIC	• The ASIC's open circuit detection (SM42) shall remain operational even if the channel's high-side supply is turned off or disabled. • Periodically (e.g. once per ignition cycle), the MCU shall enable the low-side wheelspeed supplies but shall leave the high-side supplies off. The MCU shall detect if an open-circuit is not detected on any channel. • Periodically (e.g. once per ignition cycle), the MCU shall command the wheelspeed high-side supplies off, low-side supplies on, and verify that each channel's Open Circuit SPI bit is set.	Any one wheel fails to detect an open-circuit during either the high-side or low-side supply ON check.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISMATCH_TIRE	C10EE	This monitor checks if: • Significantly different size tires installed on the vehicle. • Missing target ring (sensor picking up lug nuts) • Anything that generates consistent differences in apparent wheel rotational speed. • Different number of teeth on the exciter rings.	• Wheel Velocity Differences between one and the others > 15 %. • The mismatch tire ratio adjustment is disabled if: • Vehicle Velocity < 8.9 mph, • Cornering is detected, • Spinning wheels are detected, • Braking is detected, • Wheel speed sensor faults exist. • Counter: Count 1-up • Monitor Rate: 10ms	Wheel Velocity difference between one and the others > 15 %	• The mismatch tire ratio adjustment is disabled if: • Vehicle Velocity < 8.9 mph, • Cornering is detected, • Spinning wheels are detected, • Braking is detected, • Wheel speed sensor faults exist, • Emissions Rolls Test is active	1 Count	Type B. MIL Illumination.
WSS_DIRECTION_FAILURE_FRONT_LEFT	C2A01	This monitor checks if: • Wheel speed sensor not mounted correctly. • Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards For duration > 5 seconds While vehicle speed >15 km/h.	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.
WSS_DIRECTION_FAILURE_FRONT_RIGHT	C2A02	This monitor checks if: • Wheel speed sensor not mounted correctly. • Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards For duration > 5 seconds While vehicle speed >15 km/h.	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.
WSS_DIRECTION_FAILURE_REAR_LEFT	C2A03	This monitor checks if: • Wheel speed sensor not mounted correctly. • Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >=15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards For duration > 5 seconds While vehicle speed > 15 km/h.	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.
WSS_DIRECTION_FAILURE_REAR_RIGHT	C2A04	This monitor checks if: • Wheel speed sensor not mounted correctly. • Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	At least 1 sensor indicates Unknown, or at least 1 sensor indicates Forward and at least one sensor indicates Backwards For duration > 5 seconds While vehicle speed >15 km/h.	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
WSS_DIRECTION_FAILURE_UNKNOWN	C003F	This monitor checks if: • Wheel speed sensor not mounted correctly. Electro-magnetic interference (EMI).	• Number of valid directional and non-directional WSS sensors must be greater than 0. • Number of valid directional WSS sensors must be greater than 0. • Valid directional and non-directional WSS sensors must: • Show unfiltered wheel-speed velocity >= 15 km/h. • Show unfiltered wheel-speed acceleration < 50 m/s^2. • All valid directional and non-directional WSS sensors must show velocities within 15% of the slowest valid wheel.	When an equal number of sensors report opposite directions, this DTC is latched and all DWSS sensors are marked Failed. num_dwss_forward_dir == num_dwss_reverse_dir	• WSS must be valid (supply enabled and no electrical problems)	5 seconds	Type B. MIL Illumination.
SOL_OPEN_ISO_FRONT_LEFT	CO010	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOLOPENISOFRONTRIGHT	CO014	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On and not faulted 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_ISO_REAR_LEFT	CO018	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time,	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_ISO_REAR_RIGHT	C001C	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OPEN_DUMP_FRONT_LEFT	CO011	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_DUMP_FRONT_RIGHT	CO015	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_DUMP_REAR_LEFT	CO019	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_3WAY_PRIMARY	C0001	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OPEN_3WAY_SECONDARY	C0003	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_FDBK_UNEQUAL_TO_CMD_3WAY_PRIMARY	C0001	This monitor checks if: • Deviation in PWM output status • Defective microprocessor. • Defective printed circuit board. • Defective solenoid. • Defective solenoid driver FET.	Whenever the power switch is closed and the driver FET is not turned on (solenoid commanded off) then the feedback voltage should be high. If the solenoid feedback voltage is measured to be > 43.49% and < 65.23% of the coil supply voltage for 30 msec, an open solenoid fault is indicated	For too short on time = Ontime - 7.5% period For too long on time = Ontime + 7.5% period	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	60 ms	Type A. MIL Illumination.
SOL_FDBK_UNEQUAL_TO_CMD_3WAY_SECONDARY	C0003	This monitor checks if: • Deviation in PWM output status • Defective microprocessor. • Defective printed circuit board. • Defective solenoid. • Defective solenoid driver FET.	Whenever the power switch is closed and the driver FET is not turned on (solenoid commanded off) then the feedback voltage should be high. If the solenoid feedback voltage is measured to be > 43.49% and < 65.23% of the coil supply voltage for 30 msec, an open solenoid fault is indicated.	For too short on time = Ontime - 7.5% period For too long on time = Ontime + 7.5% period	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	60 ms	Type A. MIL Illumination.
SOL_OPEN_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2,375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_PEDAL_SIM_ISO	C0024	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OPEN_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_OPEN_SIM_TEST	C05D5	This monitor checks if: • Defective solenoid. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Leaky FET Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	After the driver is commanded on, the ASIC shall wait the open driver mask time, and then observe the filtered drain comparator feedback. If the drain feedback is high, the ASIC shall set the DRDx Open Driver Warning SPI bit. Drain comparator threshold: min value = 2.375 V max value = 2.625 V	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_FRONT_LEFT	C0010	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_ISO_REAR_LEFT	C0018	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch, The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
DRIVER_SHORT_ISO_REAR_RIGHT	C001C	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_DUMP_FRONT_LEFT	coon	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_DUMP_FRONT_RIGHT	C0015	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_DUMP_REAR_LEFT	C0019	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver • Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
DRIVER_SH0 RT_3WAY_PRIMARY	C0001	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_3WAY_SECONDARY	C0003	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_PEDAL_SIM_ISO	C0024	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
DRIVER_SHORT_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
DRIVER_SHORT_SIM_TEST	C05D5	This monitor checks if: • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• Shorted Solenoid Driver Vehicle battery voltage is applied to the high side of the solenoid coils in the ECU assembly by the power switch. The solenoids are energized using a field effect transistor (FET) to connect the low side of the coil to ground.	Solenoid_feedback ? 43%	1. Solenoid is commanded off for 20 msec 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	30 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_FRONT_LEFT	CO010	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOLSHORTISOFRONTRIGHT	C0014	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_REAR_LEFT	CO018	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_ISO_REAR_RIGHT	C001C	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_SHORT_DUMP_FRONT_LEFT	CO011	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_FRONT_RIGHT	CO015	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_REAR_LEFT	CO019	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage high when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. • The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_3WAY_PRIMARY	C0001	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_SHORT_3WAY_SECONDARY	C0003	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_NORMAL_CLOSE_DAP	C0004	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_PEDAL_SIM_ISO	C0024	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.
SOL_SHORT_SIM_TEST	C05D5	This monitor checks if: • Solenoid coils shorted internally. • Solenoid shorted to a voltage supply or ground. • Defective solenoid driver FET. • Defective printed circuit board. • Defective microprocessor. • Anything that keeps solenoid feedback voltage low when the solenoid is not energized.	• The ASIC shall detect an open driver condition or a shorted coil condition on the external driver FETs by monitoring the drain voltage while the driver is commanded on. The ASIC shall generate a filtered drain comparator feedback signal by comparing the DRDx pin voltage to the drain comparator threshold, and by then filtering the result for the drain comparator feedback debounce time.	The MCU can make the distinction between open driver and shorted coil by performing a coil test pulse on the faulted channel with all other coil channels off. Drain comparator threshold: • min value = 2.375 V • max value = 2.625 V	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	15 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVERTEMP_ISO_FRONT_LEFT	C0010	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_ISO_FRONT_RIGHT	CO014	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_ISO_REAR_LEFT	CO018	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time		Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_ISO_REAR_RIGHT	C001C	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_DUMP_FRONT_LEFT	CO011	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVERTEMP_DUMP_FRONT_RIGHT	CO015	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_DUMP_REAR_LEFT	CO019	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_DUMP_REAR_RIGHT	C001D	This monitor checks if: • Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_3WAY_PRIMARY	C0001	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_3WAY_SECONDARY	C0003	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVERTEMP_NORMAL_CLOSE_DAP	C0004	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_PEDAL_SIM_ISO	C0024	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_OVERTEMP_NORMAL_OPEN_DAP	C0002	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOLOVERTEMPSIMTEST	C05D5	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Solenoid Over Temperature • At power up the solenoids are set to the maximum of the ambient temperature as reported by the Polaris ASIC or the solenoid temperature reading stored in NVRAM from the last ignition cycle.	Solenoid_Temperature > 265 °C	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	1 s	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_ISO_FRONT_LEFT	C0010	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_DRIVER_OVERTEMP_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_ISO_REAR_LEFT	C0018	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_ISO_REAR_RIGHT	C001C	This monitor checks if: • Anything that causes the solenoid driver to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_PEDAL_SIM_ISO	C0024	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.
SOL_DRIVER_OVERTEMP_NORMAL_OPEN_DAP	C0002	This monitor checks if: Anything that causes the solenoid to be active for excessive (usually unintended) period of time	• Driver Overtemp info transmitted via SPI from Polaris ASIC	Polaris ASIC sends diagnostic information that the driver used to control the coil has exceeded the maximum alloted temperature. Microprocessor recieves the information via SPI from the ASIC	1. Solenoid is commanded On 2. Power Switch is On 3. {EXCESSIVE_LOW_SYSTEM_VOLTAGE} 7.5 V < Supply Voltage < 18 V {EXCESSIVE_HIGH_SYSTEM_VOLTAGE}	5 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CLAMP_ACTIVATION_FAILURE_ISO_FRONT_LEFT	C0010	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_ISO_FRONT_RIGHT	C0014	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_ISO_REAR_LEFT	C0018	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_ISO_REAR_RIGHT	C001C	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
CLAMP_ACTIVATION_FAILURE_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CLAMP_ACTIVATION_FAILURE_PEDAL_SIM_ISO	C0024	This monitor checks if: • Defective / Missing Flyback Diode • Defective printed circuit board • Defective Polaris ASIC	Polaris ASIC monitors the solenoid back EMF. If it is above +40V then the Polaris triggers a Clamping Response. If this occurs on two consecutive shut-offs then the Clamp Activation bit is set and the coil output is shut off. Microprocessor receives the information via SPI from the ASIC	Microprocessor receives the information via SPI from the ASIC every 5 msec. If the Clamp Activation bit is set then the bit and coil output are reset to allow another test run until the Clamp Activation Fault has matured.	1. Coil Overcurrent DTC is not set 2. No CLAMP_ACTIVATION_FAILURE DTC is set 3. execute as part of Power-Up System Test, Periodic Coil Test or anytime ABS Iso is activated during performance	45 counts (minimum 3 failures in 10 attempts)	Type A. MIL Illumination.
LEAKY_DRIVER_UNKNOWN_ABS_CIRCUITS	C0024	This monitor checks if: • Defective FET • Defective printed circuit board	• Slip Control Power Switch must be commanded ON than subsequently commanded OFF	If the 8 or more coil supply voltages decreased at a rate that is faster than expected, fault will be set.	• Power Switch is ON, then OFF • will only be retested after a power cycle	8 Count	Type A. MIL Illumination.
LEAKY_DRIVER_UNKNOWN_BOOST_CIRCUITS	C0024	This monitor checks if: • Defective FET • Defective printed circuit board	• Slip Control Power Switch must be commanded ON than subsequently commanded OFF	If the 8 or more coil supply voltages decreased at a rate that is faster than expected, fault will be set.	• Power Switch is ON, then OFF • will only be retested after a power cycle	8 Count	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_FRONT_RIGHT	CO014	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • Command is less than 720 mA. • Self-test complete. • Excessive Low Voltage fault not maturing	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_ISO_FRONT_RIGHT	CO014	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_CC_DC_SATURATED_HIGH_ISO_FRONT_LEFT	C0010	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • Command is less than 720 mA. • Self-test complete. • Excessive Low Voltage fault not maturing	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_ISO_FRONT_LEFT	C0010	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_REAR_RIGHT	C001C	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • Command is less than 720 mA. • Self-test complete. • Excessive Low Voltage fault not maturing	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_ISO_REAR_RIGHT	C001C	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_ISO_REAR_LEFT	C0018	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • Command is less than 720 mA. • Self-test complete. • Excessive Low Voltage fault not maturing	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_CC_DC_SATURATED_LOW_ISO_REAR_LEFT	CO018	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • Command is less than 720 mA. • Self-test complete. • Excessive Low Voltage fault not maturing	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_NORMAL_OPEN_DAP	C0002	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_HIGH_PEDAL_SIM_ISO	C0024	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	• Polaris is initialized. • Command is less than 720 mA. • Self-test complete. • Excessive Low Voltage fault not maturing	100 ms	Type A. MIL Illumination.
SOL_CC_DC_SATURATED_LOW_PEDAL_SIM_ISO	C0024	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	If a closed loop current control loop is broken, or if the target current is not physically achievable due to external limitations (e.g. coil resistance or supply voltage) or due the minimum on-time, the control loop's integrator shall cause the duty cycle command to saturate high or low. The time to reach saturation depends upon the tuning of the controller coefficients and the current feedback error.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOL_OVER_VOLTAGE_NORMAL_CLOSE_DAP	C0004	This monitor checks if: Defective/Missing Suppression diode Defective PCB	If the suppression diode is missing or failed the ASIC detects it by monitoring the solenoid back EMF. Reading above +40V sets the Overvoltage Warning SPI flag. The coils output is not shut-off by the ASIC. Software matures the fault by monitoring the SPI flag. NOTE: There are no suppression diodes on any of the Dump coils because they are not PWM'd.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.
SOL_OVER_VOLTAGE_SIM_TEST	C05D5	This monitor checks if: Defective/Missing Suppression diode Defective PCB	If the suppression diode is missing or failed the ASIC detects it by monitoring the solenoid back EMF. Reading above +40V sets the Overvoltage Warning SPI flag. The coils output is not shut-off by the ASIC. Software matures the fault by monitoring the SPI flag. NOTE: There are no suppression diodes on any of the Dump coils because they are not PWM'd.	Duty cycle is out of range	Polaris is initialized	100ms	Type A. MIL Illumination.
DC_SOL_REGULATION_FAILURE	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall monitor the state of each DROx output and report if it does not match the commanded state.	The MCU shall monitor ASIC's "DROx Gate Monitor Fault" SPI bits.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SOL_DUTY_CYCLE_FDBK_PLAUS_FAULT	P0606	This monitor checks if: • Problem writing coil temperature to NVRAM (Controlled_SHUTDOWN_FAILURE (loss of battery), SPI failure, NVRAM failure etc) • Problem reading Engine OFF time, used to estimate temperature cooling (Missing message, corrupted message, CAN failure etc)	The MCU shall monitor battery voltage and maintain an estimated coil temperature/resistance model. For a given current command, the MCU shall estimate the required duty cycle. The MCU shall verify that the estimated duty cycle against the ASIC's reported "CC_DRx Duty Cycle Command Feedback" match within a TBD tolerance. Current threshold is 20%	The MCU shall monitor battery voltage and maintain an estimated coil temperature/resistance model. For a given current command, the MCU shall estimate the required duty cycle. The MCU shall verify that the estimated duty cycle against the ASIC's reported "CC_DRx Duty Cycle Command Feedback" match within a TBD tolerance. Current threshold is 10%	• Polaris is initialized	15 msec	Type A. MIL Illumination.
COIL_CURRENT_FDBK_PLAUS_FAULT	P0606	This monitor checks if: • Defective system ASIC ASIC cannot control sol current properly	For CC_DRx channels in duty-cycle control mode: While a CC_DRx coil drive is commanded to greater than 0% duty cycle, the MCU shall monitor the ASIC's CC_DRx Current Result SPI field and verity the result matches the expected current. When a duty cycle command results in an CC_DRx on-time less than the minimum on time, no coil current measurement is possible. The reported CC_DRx Current Result will retain its prior value, and the corresponding Data Read bit will be 0. SW shall suspend SM102 while Data Read is 0.	For CC_DRx channels in duty-cycle control mode: While a CC_DRx coil drive is commanded to greater than 0% duty cycle, the MCU shall monitor the ASIC's CC_DRx Current Result SPI field and verity the result matches the expected current. When a duty cycle command results in an CC_DRx on-time less than the minimum on time, no coil current measurement is possible. The reported CC_DRx Current Result will retain its prior value, and the corresponding Data Read bit will be 0. SW shall suspend SM102 while Data Read is 0.	• Polaris is initialized • Coil Commanded in Duty Cycle mode	50 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SPI_FAILURE_ASIC	P0606	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor. • Noisy Power	• This fault can be set by problems communicating over SPI between the MICRO and the Polaris ASIC. It is checked ONCE at power up. • The SPI initialization will fail if the driver has not finished a previous transmission when a new transmission is required (not enough SPI throughput). • The SPI initialization will also fail if the driver detects an error (bad parity, control register data echo over the SPI or control register data read does not match). • If the Polaris ASIC fails to initialize SPI communication after 2 retries (3 attempts total) then this fault is set • Counter: Count 1-up • Monitor Rate: 1ms	Polaris Error Flag = TRUE Polaris.Error_Flags != 0 Polaris.Error_Flags_Observed |= Polaris.Error_Flags	• Power Switch is ON	3 ms	Type A. MIL Illumination.
NVRAM_DEVICE_INOPERATIVE	P062F	This monitor checks if: • Problem in chip select line • fault in SPI driver related code/circuit.	• This fault is set 1. When SPI driver is unable to do message transfer 2. If unable to write or time out before write operation could complete. 3. If requested message transfer not in time (including wait time)	device operational flag = FALSE (error during read write request occured)	• Power Switch is ON	5ms	Type A. MIL Illumination.
NVRAM_WRITE_FAILURE	P062F	This monitor checks if: • Communication problem with NVRAM chip • NVRAM hardware problem • PCB problem	• This fault is detected by the NVRAM handler. The NVRAM handler verifies a successful write event by reading back the information that is expected to be stored in NVRAM and also verifying the checksum.	If the NVRAM handler detects an unsuccessful write event three times, the fault is set.	• Power Switch in ON	60 msec	Type A. MIL Illumination.
COIL_DRIVER_SPI_FAILURE	P0606	This monitor checks if: • Defective system ASIC	• After a rising SYNC pin edge has occurred, the SW shall read the ASIC's "SYNC Armed Status" flag and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	The ASIC clears the "SYNC Armed" bit after a rising edge has occurred on the SYNC pin. The ASIC provides the "SYNC Armed Status" SPI flag, which reflects the state of the "SYNC Armed" SPI bit. After a rising SYNC pin edge has occurred, the SW reads the ASIC's "SYNC Armed Status" SPI bit and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
EXT_WATCHDOG_FAIL	P0606	This monitor checks if: • Defective system ASIC	• None.	Periodically (e.g. once per ignition cycle), the MCU shall perform the following watchdog test (or equivalent): (1) Start with the Watchdog Counter Value SPI field = 0, the WDEN pin high, and all other "watchdog-enabled functions" otherwise enabled. (2) Verify Watchdog Status SPI bit is 0 and all "watchdog-enabled functions" are disabled. (3) Service watchdog until the Watchdog Counter Value = 6. Verify the conditions from (2) remain. (4) Set the WDEN pin low, then service the watchdog. (5) Confirm the Watchdog Counter Value = 7 and all "watchdog-enabled functions" are disabled. (6) Allow the watchdog to timeout, then set the WDEN pin high. (7) Confirm the Watchdog Counter Value = 0, Watchdog Status bit is 0, and all "watchdog-enabled functions" are disabled. Watchdog-enable functions are: (1) solid state relay driver pin (VDG), (2) the motor 1/2 bridge pre-driver pins (PDG and PRG), (3) the ENQ digital output pin, and (4) the low-side coil drivers (CC_DRx) and pre-drivers (DROx).	• Polaris is initialized	10 msec	Type A. MIL Illumination.
AD_PERIPHERAL_TIMEOUT_FAILURE	P060B	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor.	• A/D Peripheral Timeout Failure • When reading an A/D channel, the software enters a "wait" loop where it looks for a bit in an A/D register to be set, indicating that the conversion is complete. A "timeout" mechanism exists that breaks out of the wait loop after 100 usee (well longer than it is ever expected to complete an A/D conversion) has elapsed. If this timeout mechanism is executed, a fault code is set. • Counter: Count 1-up • Monitor Rate: 10ms	Adc Port Lockup Detected = TRUE	• Power Switch is ON	5ms	Type A. MIL Illumination.
ADEVENTLOCKUP	P060B	This monitor checks if: • Defective printed circuit board. • Defective Polaris ASIC. • Defective microprocessor.	A/D Event Lockup Failure Two detection methods: No A/D conversions in the last 5 msec: A counter is incremented when A/D conversion results are retrieved. Every 5 msec this counter is checked. If it is 0, then the AD_EVENT_LOCKUP fault will begin to mature. If greater than 0, then it is cleared. 2 consecutive failures are needed to set the fault. Adc_Synchronization_Failed flag is TRUE: The ASIC will set this flag TRUE when the conversion count (number of channels converted) is larger than what is expected (9). 2 consecutive failures are needed to set the fault.	Adc Lockup Count = 0 or Adc Synchronization Failed = TRUE	• Power Switch is ON	5ms	Type A. MIL Illumination.
SOLENOID_TIMEOUT_FAILURE	P0606	This monitor checks if: • Defective microprocessor. • Incorrect microprocessor application code.	Each solenoid in the system is expected to generate ON test pulses to indicate the end of a solenoid pulse duration. At the completion of the System Self-Test, the number of ON test pulses issued during initial test and compare them with the number of ON tests performed from the failsafe monitor. If the number of ON test pulses issued does not equal the expected number of pulses, a failure is indicated and this fault is set.	Solenoid[solenoid_id].Sol_On_Test_Cnt != Solenoid[solenoid_id].Expected_Sol_Test_Cnt	• Mode manager is normal mode • Power switch is not faulted • System is not initializing • System is not re-initializing • Engine is not being cranked • Diagnostic commands are not requested • System is not shutting down	5ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SOLENOID_PERIODIC_INTERRUPT_FAILURE	P0606	This monitor checks if: • Defective microprocessor. Incorrect microprocessor application code, ex. Bad scheduler	HET Periodic Interrupt Failure Verifies that one particular High End Timer interrupt (HET) feedback; occurs every pass through the schedule loop time (10MS). This fault is set if no HET interrupt feedback has occurred for 3 consequentive schedule loop time (10MS). The HET interrupt feedback that is checked is the solenoid feedback interrupts, This Solenoid feedback interrupt is scheduled every interval of the operating system. The fault is cleared when above condition does not exist. Counter: Count 1-up-Reset Monitor Rate: 10MS	periodic het interrupt flag = FALSE (periodic interrupt did not occur)	Power Switch is ON	5ms	Type A. MIL Illumination.
SYS_ASIC_U3_SELECT_FAILURE	P0606	This monitor checks if: Defective system ASIC Missing external U3 FET when external U3 FET is expected (less current delivered with internal FET) Existing U3 FET when 113FET is not expected (Note: No system reaction required)	If the external U3 FET is present, the ASIC shall set the U3 External FET SPI bit, if not present it will clear the bit. Software sets fault if bit is opposite of what is expected.	The MCU shall read the ASIC's U3 External FET status bit and compares against the expected value.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_WDEN_STATUS_CORR	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall provide the WDEN Status SPI bit which reflects the filtered state of the WDEN pin. The MCU shall monitor the ASIC's WDEN Status SPI flag and verify it is the expected value.	WDEN Status SPI flag <> WDEN PIN status	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_EXCESS_STARTUP	P0606	This monitor checks if: • Defective system ASIC	• During the power-on sequence, the ASIC shall monitor the U5, U3, and U1 voltages, with respect to the discharge voltage threshold. • If the power-on sequence is delayed (e.g. due to a slow U5, U3, U1, discharge), the ASIC shall report the Excessive Startup Time SPI flag.	The MCU shall monitor the ASIC's Excessive Startup Time SPI flag.	• Polaris is initialized	5 msec	Type A. MIL Illumination.
SYS_ASIC_EXCESS_STARTUP_AT_SPEED	P0606	This monitor checks if: • Defective system ASIC	• During the power-on sequence, the ASIC shall monitor the U5, U3, and U1 voltages, with respect to the discharge voltage threshold. • If the power-on sequence is delayed (e.g. due to a slow U5, U3, U1, discharge), the ASIC shall report the Excessive Startup Time SPI flag.	The MCU shall monitor the ASIC's Excessive Startup Time SPI flag.	• Polaris is initialized	5 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_ADC_REF_HIGH	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI).Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_ADC_REF_MID	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI).Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	25 msec	Type A. MIL Illumination.
SYSASICADCREFLOW	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall provide three ADC test voltage channels fixed to internal voltage references: Vhigh (ADREFHI).Vlow (GND_Q1), and Vmid (ADREFHI/2).	Each software loop, the MCU shall read the ADC conversion results for the Vhigh, Vlow and Vmid ASIC ADC channels over SPI, and compare them against fixed detection thresholds. Note: This MCU requirement is the same as in SM137.	• Polaris is initialized	50 msec 10 Counts	Type A. MIL Illumination.
SYS_ASIC_ADC_ATTN_BIT_STUCK	P060B	This monitor checks if: • Defective system ASIC	The MCU once per power cycle commands each ASIC external ADC channel with the attenuation mode opposite of normal operation and verify that its attenuation enable feedback SPI bit is not stuck. Commanded 10 times and if 3 in a row are failed the fault is set.	Any one of the 10 ASIC external ADC channel's attenuation enable feedback SPI bits is stuck	• Polaris is initialized	Time 3 ms = Goal 3 counts	Type A. MIL Illumination.
SYS_ASIC_ADC_ATTN_FACTOR	P060B	This monitor checks if: • Defective system ASIC	• Each background conversion loop, the ASIC shall perform the conversion of the internal Vmid voltage both with and without the selectable attenuation switched in. The conversion results shall be stored respectively in the separate ADC Vmid with Attenuation Test Result and ADC Vmid Test Result SPI fields. • Each software loop, the MCU shall calculate the ASIC's ADC attenuation factor by reading the ADC Vmid with Attenuation Test Result and ADC Vmid Test Result SPI fields, calculate the ASIC's ADC attenuation factor by dividing the attenuated result by the non-attenuated result, and verify the resulting attenuation factor is within limits.	Calculated ADC attenuation factor < 0.6176 OR Calculated ADC attenuation factor > 0.6320	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_EXT_ADC_FAILURE	P060B	This monitor checks if: • Defective Polaris ASIC.	The ASIC reports the state of the attenuation (selected or not selected) for each external ADC channel via the "ADx Attenuation Feedback" SPI bits within the ADC result registers. For fault detection purposes, the feedback bits directly monitor the control signal state within the SAR Logic, as opposed to only echoing the "ADx Attenuation Select" command. Each time an ASIC external ADC channel is read over SPI, the SW also reads the "ADx Attenuation Feedback" bit and compare the result against the expected (i.e. commanded) attenuation setting.	Compare the ASIC external ADC channel read of SPI and the ADx Attenuation feedback bit against expected attenuation setting	• Polaris is initialized	15ms	Type A. MIL Illumination.
SYS_ASIC_SYNC_PULSE_DETECT	P0606	This monitor checks if: • Defective system ASIC	• ASIC provides SYNC ARMED SPI mapped bit that can be set and cleared through SPI, or cleared by detected valid SYNC rising edge event. • Provide un-armed SYNC edge detected SPI mapped bit.	Periodically (e.g. once per ignition cycle) the MCU shall send a rising edge on the SYNC pin, while the SYNC Armed SPI bit is low. The MCU shall verify that the Unarmed SYNC Edge Detected SPI flag is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYSASICSPIDETECT	P0606	This monitor checks if: • Defective system ASIC	• None.	Periodically, and within the fault response time, the MCU shall send separate SPI frames with: (1) an incorrect CRC (2) an incorrect number of SPI bits (3) an invalid command (invalid address) (4) invalid data The MCU shall then verify that the CRC is corrupted in the ASIC's response frame to each of the above errors.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_REGISTER	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall provide the Storage SPI register. The register contents shall have no effect on the ASIC operation. Register contents shall only be modified by a SPI write and not by any internal ASIC action.	Every major software loop (e.g. 5 - 10ms), the MCU shall perform a write to, normal mode read from and dump mode read from the Storage SPI register. Each loop, the value written shall change, and shall include checkerboard (OxAA,0x55), walking 1s and walking Os). The MCU shall verify the written and read values match. After performing a write to a safety critical SPI register, the MCU shall perform a read back of the same register, and verify that the contents were written. The read shall occur within the same software loop, in order to allow the MCU to correct any mis-write within the fault response time. Note: The read back refers to a separate read request, and is not the same as verifying the write echo.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_DUPL_SEED	P0606	This monitor checks if: • Defective system ASIC	• None.	The MCU shall detect if ASIC provides the same seed value 3 times in a row.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_AD_REFRESH_FAILURE	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall set the Data Read bit to indicate that an individual ADC result has been updated since the register was last read.	Each time an ASIC ADC channel is read over SPI, the MCU shall also read the Data Read bit. If the Data Read bit is not set, the MCU treats the result as old data. If the Data Read bit is not set and the time since the prior ADC read is longer than the ASIC ADCs background loop time, the MCU shall detect a fault Periodically (e.g. once per ignition cycle), the MCU shall read each ADC result register immediately 3 times in a row. If the Data Read bit is never low during the 3 reads, flag a fault that the Data Read bit is stuck high. Repeat for all ASIC ADC channels. Note: Because the ASIC could update the result register between two register reads (resulting in two high Data Read bits), 3 successive reads are required.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_AD_DATA_READ_STUCK	P060B	This monitor checks if: • Defective system ASIC	• The ASIC shall set the Data Read bit to indicate that an individual ADC result has been updated since the register was last read.	Periodically (e.g. once per ignition cycle), the MCU shall read each ADC result register immediately 3 times in a row. If the Data Read bit is never low during the 3 reads, flag a fault that the Data Read bit is stuck high. Repeat for all ASIC ADC channels. Note: Because the ASIC could update the result register between two register reads (resulting in two high Data Read bits), 3 successive reads are required.	• Polaris is initialized	1 msec	Type A. MIL Illumination.
SYS_ASIC_MISSING_SYNC_EDGE	P0606	This monitor checks if: • Defective system ASIC	• After a rising SYNC pin edge has occurred, the SW shall read the ASIC's "SYNC Armed Status" flag and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	The ASIC clears the "SYNC Armed" bit after a rising edge has occurred on the SYNC pin. The ASIC provides the "SYNC Armed Status" SPI flag, which reflects the state of the "SYNC Armed" SPI bit. After a rising SYNC pin edge has occurred, the SW reads the ASIC's "SYNC Armed Status" SPI bit and detects if the bit is still high (indicating the rising SYNC pin edge was not detected).	• Polaris is initialized	15 msec	Type A. MIL Illumination.
DC_SOL_ON_TIME_MON_FAILED	P0606	This monitor checks if: • Defective system ASIC ASIC is not controlling PWM properly	The ASIC shall monitor the filtered DRDx feedback voltage and shall provide an on-time counter (for each channel) which shall accumulate the QDRx on-time. At each valid SYNC edge, the ASIC shall latch the current accumulated value into the DRDx On-Time Feedback Register and clear the on-time counter. The MCU shall integrate the commanded on-time between valid SYNC pulses and verify it matches the ASIC's reported result. Current threshold is 250 * MICROSECOND	Compare the solenoid commanded on time to the measured on time. If the difference in the two times is >250 microsec for 10 consecutive checks then the fault is immediately matured	• Polaris is initialized	50 msec	Type A. MIL Illumination.
SYS_ASIC_UNEXPECTED_SYNC_PULSE	P0606	This monitor checks if: • Defective Polaris ASIC.	• The MCU shall monitor the ASIC's Unarmed SYNC Edge Detected SPI bit and verify no expected SYNC pin edges have occurs. • After a rising SYNC pin edge has occurred (e.g. at the start of the next software loop), the MCU shall read the ASIC's SYNC Armed Status SPI bit and confirm that the rising SYNC pin edge occurred (in which case the bit will be low).	Fault will set if the MCU detects an unexpected sync pulse from the ASIC by monitoring the Unarmed SYNC Edge Detected SPI bit	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_SYNC_TIMEOUT	P0606	This monitor checks if: • Defective Polaris ASIC. • Defective microprocessor. • Operating system failure	The ASIC detects if the time since the prior valid rising SYNC edge exceeds the SYNC timeout time. Then the ASIC turns off the coil drivers and sets the "SYNC Timeout" SPI bit. The SW monitors the ASIC's "SYNC Timeout" SPI bit to detect if a SYNC Timeout has occurred.	This fault would be set if the SPI bit SYNC Timeout is set for 25msec	• Polaris is initialized	max 17ms	Type A. MIL Illumination.
SYS_ASIC_CONFIG_REG_FAILURE	P0606	This monitor checks if: • register error • register rewrite error	• Configuration Registers: (These are written once at startup.) After writing once, read back and verify their contents during every subsequent 5ms SPI loop.	Rewrite registers with an incorrect value Verify if the write was successful during the following 5ms SPI loop's read & verify. If the rewrite is not successful after 3 attempts in a row, set a fault.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_CONTROL_REG_FAILURE	P0606	This monitor checks if: • register error • register rewrite error	• Control Registers: (These are written every 5ms loop for control or failsafing purposes.) For those registers not covered by other SMs, read and verify every 5ms loop, prior to performing the write.	Rewrite registers with an incorrect value Verify if the write was successful during the following 5ms SPI loop's read & verify. If the rewrite is not successful after 3 attempts in a row, set a fault.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
ENQ_PIN_FAILED	P0606	This monitor checks if: • Defective ASIC.	• The Polaris ASIC provides a digital push-pull output, ENQ. ENQ is high when the ENQ Enable SPI bit is set, the Watchdog Status is "in range", WDEN Status is high, and nRST Status is high. Otherwise ENQ is low. ENQ is used as a pre-driver to enable ECU circuitry.	The MCU shall continuously monitor the ASIC ENQ feedback signal state and verify that it has the expected state. The HW shall provide a digital feedback signal of ASIC ENQ signal to MCU digital input.	• Polaris is initialized	10 msec	Type A. MIL Illumination.
BROKEN_WIRE_TEMP_FDBK_A	P0606	This monitor checks if: • Improper (broken wire) connection between the external analog sensor and the input pin. • Defective microprocessor.	• Conversion results for VHigh and VLow ADC channels are out of range, then Broken Wire fault is set.	• Each software loop, ADC conversion results for VHigh and VLow MMC ADC Channels are read. • If conversion results for VHigh and VLow are out of range, then Broken Wire fault is set.	• Power Switch is ON	5 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CANFD1_SPI_FAILURE	P0606	This monitor checks if: • Problem in chip select line • fault in SPI driver related code/circuit. • If SPI communication is not successful and if we are not able to communicate with the CAN transceiver	• This fault is set 1. When SPI driver is unable to do message transfer 2. If unable to write or time out before write operation could complete. 3. If requested message transfer not in time (including wait time)	device operational flag = FALSE (error during read write request occured)	• Power Switch is ON	1 count	Type A. MIL Illumination.
CANFD2_SPI_FAILURE	P0606	This monitor checks if: • Problem in chip select line • fault in SPI driver related code/circuit. • If SPI communication is not successful and if we are not able to communicate with the CAN transceiver	• This fault is set 1. When SPI driver is unable to do message transfer 2. If unable to write or time out before write operation could complete. 3. If requested message transfer not in time (including wait time)	device operational flag = FALSE (error during read write request occured)	• Power Switch is ON	1 count	Type A. MIL Illumination.
NVM_REQ_FAILED	P062F	This monitor checks if: • Eep Driver reports JobErrorNotification, indicating that the request failed, either after it was accepted or because the module refused the request	If a user request is either rejected and the number of configured retries expired or if it was accepted and then failed, while being processed by the underlying memory stack module.	NvM_CurrentBlockInfo_t.LastResult_t != NVM_REQ_OK	Continuous failsafing	1 count	Type A. MIL Illumination.
NVM_INTEGRITY_FAILED	P062F	This monitor checks if: • If the read for a block detects that the data and/or CRC are corrupted based on the CRC check performed after the read was finished successfully	If the processing of a read request will detect, via the CRC checking, corruption of the data and/or CRC of the block that was subject to the read operation.	NvM_CurrentBlockInfo_t.LastResult_t == NVM_REQ_INTEGRITY_FAILED	Continuous failsafing	1 count	Type A. MIL Illumination.
NVM_LOSS_OF_REDUNDANCY	P062F	This monitor checks if: If the contents are different, if the first instance becomes corrupted or if the first instance cannot be read then NvM will report this fault.	If the reading performed over a REDUNDANT block indicates the block has lost its redundancy.	one block is OK, other isn't -> block isn't redundantly stored within NV RAM. if(firstBlockDefect ^ secondBlockDefect) == TRUE	Continuous failsafing	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
NVM_QUEUE_OVERFLOW	P062F	This monitor checks if: If the number of requests made to NvM exceeds the size of the queue and none of the ones in the queue finishes, NvM will not have any more space where to store the requests. In this case it will report the fault to Dem.	If a request is made that cannot be stored in the NvM queue (be it standard or immediate) as all configured queue positions of the related queue are already containing user requests.	queue was full, request to queue the next block leads to queue overflow	Continuous failsafing	1 count	Type A. MIL Illumination.
EEP_FAILURE	P062F	This monitor checks if: SPI transmission is faulty	The failure is set in case of a failed sequence due to a failure of the SPI transmission. A sequence can also fail if a transfer was rejected because of full transmit buffer.	EEP_E_CANCEL_FAILED - DEM event if a job cancelation failed EEP_E_READ_FAILED - DEM event if read job failed EEP_E_COMPARE_FAILED - DEM event if compare job failed EEP_E_TEST_COM_FAILED2 - DEM event if test communication job failed EEP_E_WRITE_FAILED - DEM event if write job failed EEP_E_ERASE_FAILED - DEM event if erase job failed	Continuous failsafing	1 count	Type A. MIL Illumination.
SYS_ASIC_U1_SELECT_FAILURE	P0606	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• The U1 operating mode and voltage level selections are viewable via the U1 Mode Select Status and U1 Voltage Select Status SPI fields. The SPI feedback signals are internally routed so that they monitor the true state of the mode and voltage control circuits.	The MCU verifies that the U1 Mode Select Status and U1 Voltage Select Status SPI fields in register 0x45 match the values which are hard-coded into SW corresponding the application's intended HW population. If a mismatch is detected, fault is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_NVM_FAIL	P062F	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• During the ASIC's full active logic reset sequence (within the active mode), the ASIC shall read and compare the primary and inverted U1 mode and voltage SPI fields. • If primary and inverted SPI fields do not match, the ASIC shall configure the U1 regulator in the 1.1V, supervisor mode configuration and shall set the TRW NVM Fail SPI bit in registers 0x45 and 0x61.	The MCU shall periodically verify that the TRW NVM Fail SPI bit (reg 0x45) is low. If the bit is read as high, fault is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_SM_DISABLED	P0606	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• The ASIC shall set the Safety Mechanisms Disabled SPI bit when a test mode is active which prevents the ASIC from resetting the MCU or disabling power supplies in reaction to a fault.	The MCU shall periodically verify that the Safety Mechanisms Disabled SPI bit is low. If the bit is read as high, fault is set.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_SPI_TRANSFER_ERROR	P0606	This monitor checks if: • SPI transfer error • ASIC problem • PCB problem	• The micro monitors the SPI data transmissions and checks for SPI transfer errors	If any of the below errors are observed in Spi Data transmission this fault will set. POLARIS_SPI_NOT_INITIALIZED POLARIS_SPI_TRANSFER_REJECTED POLARIS_SPI_TX_MSG_LENGTH_ERROR	• Continuous failsafing	15 msec	Type A. MIL Illumination.
ROM_CRC_FAILURE	P0606	This monitor checks if: • Defective microprocessor • Incorrect fault detection algorithm	• CRC ROM Failure R4 • The ROM self-test is a dynamic test that is called from the scheduler at a rate of 5 msec. Each ROM section is checksummed byte by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the setion is verified for a correct checksum stored at the end of the section.	calculated CRC != stored CRC	• Power Switch is ON	5 msec	Type A. MIL Illumination.
LMU_DATA_PATH_TEST_FAILURE	P0606	This monitor checks if: Permanent failure of the LMU (Local Memory Unit) SRAM data path	The fault will be set if the data written to the LMU SRAM does not match the data read back from the same location of the LMU SRAM	The test consists of the following sequence: 1. Write 8 different 8-bit values to sequential addresses in LMU SRAM. Data pattern: 0x1122334455667788 2. Perform a 64-bit read and compare against expected values 3. Write 4 different 16-bit values to sequential addresses in LMU SRAM. Data pattern: 0xEEDDCCBBAA998877 4. Perform a 64-bit read and compare against expected values 5. Write 2 different 32-bit values to sequential addresses in LMU SRAM. Data pattern: 0XA5A5A5A5A5A5A5A5 6. Perform a 64-bit read and compare against expected values	Always runs during initialization	1 Count	Type A. MIL Illumination.
OS_TASK_MONITOR_FAULT_COREO	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Checks to be sure that all tasks on CPUO are running	None	Always Enabled	1 count	Type A. MIL Illumination.
OS_TASK_MONITOR_FAULT_CORE1	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Checks to be sure that all tasks on CPU1 are running	None	Always Enabled	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
OS_TASK_MONITOR_FAULT_CORE2	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Checks to be sure that all tasks on CPU2 are running	None	Always Enabled	1 count	Type A. MIL Illumination.
OS_INTERNAL_FAILURE_COREO	P0606	This monitor checks if: Failure in a hardware system that the OS depends on.	The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on.	None	Always Enabled	10 msec	Type A. MIL Illumination.
OSJNTERNAL_FAILURE_CORE1	P0606	This monitor checks if: Failure in a hardware system that the OS depends on.	The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on.	None	Always Enabled	10 msec	Type A. MIL Illumination.
OSJNTERNAL_FAILURE_CORE2	P0606	This monitor checks if: Failure in a hardware system that the OS depends on.	The OS has detected a serious failure such that, as determined by the OS vendor, it cannot continue safe operation on at least 1 CPU. This is most likely because of a failure in a hardware system that the OS depends on.	None	Always Enabled	10 msec	Type A. MIL Illumination.
RTOSFAILURECOREO	P0606	This monitor checks if: Software Error	EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code.	None	Always Enabled	5*Number of errors in 10ms update Cycle	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
RTOS_FAILURE_CORE1	P0606	This monitor checks if: Software Error	EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code.	None	Always Enabled	5*Number of errors in 10ms update Cycle	Type A. MIL Illumination.
RTOS_FAILURE_CORE2	P0606	This monitor checks if: Software Error	EB OS detects an error situation and calls ErrorHook with a status code for which there is no other fault code.	None	Always Enabled	5*Number of errors in 10ms update Cycle	Type A. MIL Illumination.
UNEXPECTED_EXCEPTION_COREO	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will call ProtectionHook with status code E_OS_PROTECTION_EXCEPTION provided the following two aspects are true. 1-The trap was not a normal function of the OS. 2-The OS does not have another more specific error code to use, such as E_OS_PROTECTION_MEMORY for a MPU violation.	None	Always Enabled	10 msec	Type A. MIL Illumination.
UNEXPECTED_EXCEPTION_CORE1	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will call ProtectionHook with status code E_OS_PROTECTION_EXCEPTION provided the following two aspects are true. 1 —The trap was not a normal function of the OS. 2-The OS does not have another more specific error code to use, such as E_OS_PROTECTION_MEMORY for a MPU violation.	None	Always Enabled	10 msec	Type A. MIL Illumination.
UNEXPECTED_EXCEPTION_CORE2	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	The CPU detects a situation where it cannot successfully complete an instruction, such no memory exists at the read/write address or instruction code is invalid. The CPU branches to a predefined Trap address and control is transferred to the Elektrobit OS. The EB OS will call ProtectionHook with status code E_OS_PROTECTION_EXCEPTION provided the following two aspects are true. 1 —The trap was not a normal function of the OS. 2-The OS does not have another more specific error code to use, such as E_OS_PROTECTION_MEMORY for a MPU violation.	None	Always Enabled	10 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
FSMC_MISMATCH_VELOCITY	P0606	This monitor checks if: • Defective • Microprocessor • At least one • wheel velocity • calculation • between • Micro 1 and • Micro 2 does not agree	• Mismatched Wheel Velocity Failure • Both micro 1 and micro 2 are calculating the velocity for each wheel. All wheel speeds computed by the micro 1 are transmitted to the micro 2 every loop time. The micro 2 compares them to the appropriate velocities received from the micro 1.	Tolerance of any wheel velocity calculations is > +/- 10 km/h	• High wheel acceleration inhibits this routine	35 ms	Type A. MIL Illumination.
LOGICAL_SEQUENCE_FAULT_COREO	P0606	This monitor checks if: Improper sequencing of runnables	If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 0 is set.	Fault is set if LSM flag in Core 0 is set.	Continuous Failsafing	1 count	Type A. MIL Illumination.
LOGICAL_SEQUENCE_FAULT_CORE1	P0606	This monitor checks if: Improper sequencing of runnables	If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 1 is set.	Fault is set if LSM flag in Core 1 is set.	Continuous Failsafing	1 count	Type A. MIL Illumination.
LOGICAL_SEQUENCE_FAULT_CORE2	P0606	This monitor checks if: Improper sequencing of runnables	If the software finds mismatch in current sequence compared to predefined sequence of the runnables then LSM flag in Core 2 is set.	Fault is set if LSM flag in Core 2 is set.	Continuous Failsafing	1 count	Type A. MIL Illumination.
CPU_FAILURE_SEVERITY_X	P0606	This monitor checks if: • Defective microprocessor • Improper Application Code	The SW shall configure the MCU's fault manager to signal MCU faults via alarm but don't require the MCU to be held in reset.	See Aurix_Alarms_Update.xlxs for which alarm indicates what MCU faults and set the CPU_FAILURE_SEVERITY_X fault.	• Power Switch in ON		Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
CPU_FAILURE_SEVERITY_Y	P0606	This monitor checks if: • Defective microprocessor • Improper Application Code	Activates the FSP then checks to see if it truly got activated. Also, checks to see if the ASIC saw the FSP pin activate.	If Polaris feedback does not match FSP command OR If Aurix feedback does not match FSP command	• Power Switch in ON		Type A. MIL Illumination.
CPU_FAILURE_SEVERITY_TRANSIENT	P0606	This monitor checks if: • Defective microprocessor • Improper Application Code	The SW shall configure the MCU's fault manager to signal MCU faults via alarm and configures hardware intervention to hold MCU in reset. When the alarm occurs, SW stores information in NVRAM. On the next Ignition cycle if SW sees indication stored in NVRAM that indicates we had an FSP occur, we set the fault. Note: There is no gaurantee that SW is able to write to NVRAM depending on what has failed.	See Aurix_Alarms_Update.xlxs for which alarm indicates what MCU faults and set the CPU_FAILURE_SEVERITY_TRANSIENT fault.	• Power Switch in ON		Type A. MIL Illumination.
SYS_ASIC_SYNC_TIME_MISMATCH_FAULT	P0606	This monitor checks if: • Defective system ASIC	• At each valid SYNC edge, the ASIC shall store the time between that edge and the prior valid SYNC edge in the Prior SYNC Interval Time SPI register field.	The MCU shall measure time between SYNC edges (based upon the MCU clock) and verify the time matches the ASIC's Prior SYNC Interval Time SPI field.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_TARGET_CURRENT_DETECT	P0606	This monitor checks if: When any ABS ISOs, NO DAP or PEDAL_SIM solenoids are: • Shorted Solenoid OR • Open Solenoid Driver OR • Open Flyback diode OR • Power input to module is noisy	tests all pass on next ignition cycle	Periodically (e.g. once per ignition cycle), the MCU commands the maximum coil current with the solid state relay off for three, 5ms SW loops. SW checks the "CC_DRx High Target Unreachable" SPI flag each 5ms SW loop from time of the first maximum current command to two loops after the third command loop (i.e. 5 loops total). At any point, if the "CC_DRx High Target Unreachable" SPI flag is read back high, the High Target Current Unreachable diagnostic test passes, and the remainder of the High Target Current Unreachable test (command and flag read backs) are aborted. If the "CCJDRx High Target Unreachable" flag is never set during the 5 read loop, the diagnostic test fails. Periodically (e.g. once per ignition cycle), the MCU shall command the minimum non-zero coil current with the solid state relay on for three, 5ms SW loops. SW shall check the "CC_DRx Low Target Unreachable" SPI flag each 5ms SW loop from time of the first minimum current command to two loops after the third command loop (i.e. 5 loops total). At any point, if the "CC_DRx Low Target Unreachable" SPI flag is read back high, the Low Target Current Unreachable diagnostic test passes, and the remainder of the Low Target Current Unreachable test (command and flag read backs) are aborted. If the "CC_DRx Low Target Unreachable" flag is never set during the 5 read loop, the diagnostic test fails.	• Polaris is initialized	15 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_DRIVER_SHORT_DETECT	P0606	This monitor checks if: • Defective system ASIC	• The ASIC shall not automatically inhibit the Shorted Driver Detection (SM37) when the SSR is off.	Periodically (e.g. once per ignition cycle), the MCU shall disable the SSR, enable the CC_DRx and DROx drivers, command OA or 0% duty cycle, and verify that the Open Coil / Shorted Driver Warning Valid bits are set, and verify that a Shorted Driver Warning is reported on each driver channel.	• Polaris is initialized	15 msec	Type A. MIL Illumination.
SYS_ASIC_SSR_SELF_TEST_FAILED	P0604	This monitor checks if: • Solid State Relay problem • Defective ASIC • PCB problem	• The MCU performs various tests on the Solid State Relay during System Self Test.	(1a) Se/Command: Watchdog Counter Value SPI field = 0, WDEN pin low, the Enable Failsafe SSR SPI bit = 0, and the SSR Shut Off Pin low (= off). (1b) Verify the Coil Supply Voltage is low. (2a) Set the WDEN pin high, the Enable Failsafe SSR SPI bit = 1, and the SSR Shut Off Pin high (= on). Do not service the Watchdog. (2b) Verify the Coil Supply Voltage is low. (3a) Service Watchdog until the Watchdog Counter Value SPI field = 6. (3b) Verify the Coil Supply Voltage is low. (4a) Set the WDEN pin low, then service the Watchdog once, such that the Watchdog Counter Value SPI field = 7. (4b) Verify the Coil Supply Voltage is low. (5a) Set the Enable Failsafe SSR SPI bit = 0, then set the WDEN pin high. (5b) Verify the Coil Supply Voltage is low. (6a) Set the SSR Shut Off Pin low (= off), then set the Enable Failsafe SSR SPI bit = 1. (6b) Verify the Coil Supply Voltage is low. (7a) Allow the Watchdog to timeout, then set the SSR Shut Off Pin high (= on). The time between (4a) and (7a) should be counted toward the required timeout time. If the time between (4a) and (7a) is more than 34ms, a watchdog service event must be added in-between to prevent the Watchdog from timing out before (7a). (7b) Verify the Coil Supply Voltage is low and verify the Watchdog Counter Value SPI field = 0. If any of the above tests failed , retry the re enable all the inputs that are being disabled for this test, and re run this test two more times. If it is still failed then set the fault. If any of the above tests failed , retry the re enable all the inputs that are being disabled for this test, and re run this test two more times. If it is still failed then set the fault.	• Runs during initialization	30 msec	Type A. MIL Illumination.
SYS_ASIC_WDOG_COUNT_TEST_FAILED	P0606	This monitor checks if: • Watchdog problem • Defective ASIC • PCB problem	• This fault tests the watchdog by purposefully allowing the watchdog to time out and checking to see how the watchdog reacts	Allow the Watchdog to timeout. Timeout shall occur 34ms to 42ms after the last watchdog service occurred, The time taken to timeout the watchdog counter should be counted toward the required timeout time. If the time is not in a range of 34 to 42 msec this fault should set	• Runs during initialization	34 msec	Type A. MIL Illumination.
WDOG_DYNAMIC_TEST_FAILURE	P0606	This monitor checks if: • Defective printed circuit board. • Defective ASIC. • Defective microprocessor.	• Watchdog Dynamic Test Failure • The micro sends a bad watchdog response value back to the ASIC periodically to verify that the ASIC does move towards disabling the system when the watchdog is not correctly being updated. Each loop, the watchdog status counter is checked. After the bad value is sent, the logic tests the status counter to verify that it moved towards disabling the system. If the ASIC operation did not move towards disabling the system, the logic assumes that the watchdog is not able to function properly. As a result, the logic disables the system because the watchdog operation cannot be assumed to be correct. 2 occurrences of this failure is needed to set the fault.	If the ASIC operation has not moved towards disabling the system, the logic assumes that the watchdog is not able to function properly. As a result, the logic disables the system because the watchdog operation cannot be assumed to be correct. 2 occurrences of this failure is needed to set the fault.	• Power Switch is ON	10 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_U1_UV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	When the U5 or U3 Undervoltage Diagnostic SPI bit is set, the ASIC raises the effective U5 out of range lower warning level, or the U3 undervoltage fault threshold above the maximum U5 or U3 regulation voltage, thus forcing a U5 out of range warning or U3 undervoltage fault. Periodically, the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 undervoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_OSCI_RESET_TEST_FAULT	P0606	This monitor checks if: • Oscillator problem • Defective ASIC • PCB problem	• The ASIC shall provide a means to periodically verify that the ASIC is capable of detecting an Oscillator Fault condition and entering the Oscillator Fault Power-down Mode. • From within TRW Test Mode, the ASIC shall provide Main and Supervisor Oscillator Diagnostic bits, which are capable of diving the main oscillator frequency by 2, stopping the main oscillator, dividing the supervisor oscillator frequency by 2, and stopping the supervisor oscillator. • Periodically (e.g. once per ignition cycle) the MCU shall store a flag in NVM indicating that it will perform a oscillator diagnostic. The MCU shall then force one of the four oscillator test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_LOGIC_RST_STUCK_DETECT	P0606	This monitor checks if: • Reset source register problem • ASIC problem • PCB problem	• The MCU continuously monitors the External LOGIC_RST Reset SPI bit within the Reset Source Register.	The MCU shall read the ASIC's External LOGIC_RST Reset SPI field. If the SPI bit is high, fault is set.	• Continuous failsafing	15 msec	Type A. MIL Illumination.
MULTIPLE_STARTUP_FAILURE	P0606	This monitor checks if: • Defective CPU	The library of micro safety tests are run at every power-up. If any test fails the results are stored and the system is soft reset. If after the reset, any different test or procedure fails then a MULTIPLE_STARTUP_FAILURE is latched	Any two different Safety Test flags are reported as FAILED in two consecutive tests	Enabled at power up	1 count	Type A. MIL Illumination.
SBST_CORE2_FAILURE	P0606	This monitor checks if: Failure of the CPU core	Fault is set if SafeTlib test "CpuTst_CpuSbstPTst()" fails	Every 1 second the SafeTlib test "CpuTst_CpuSbstPTst()" is run. The fault is set if it returns a failure.	Continous - Always enabled	1 Count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
UNIMPLEMENTED_INTERRUPT_COREO	P0606	This monitor checks if: Defective CPU	When the failsafe is called during runtime, it will loop through all the SRC registers to find if there is any pending interrupt from disabled interrupt source	If SRPN bits in SRC register of Interrupt router is zero then the fault will set if SRR bit of SRC register is set	Continuous Failsafing	300 counts	Type A. MIL Illumination.
ADC_FAILURE	P060B	This monitor checks if: • Defective CPU	Fault sets under the following circumstances: An AD pin is read. Using the Conversion Diagnostics, a pull down is tied to the pin and read again. Then, a pull up is tied to the pin, and read again. Then, the pull devices are removed, and the pin is read a 4th time. The fault will be set if the pull down did not pull the value down by at least 20%, or, the pull up did not pull the value up by at least 20%, or the reread value changed from the initial value by more than 3%. Repeat on another AD pin.	If (pulled down value read > initial value read * 0.8) OR If (pulled up value read < initial value read * 1.2) OR If (reread value > initial value read*1.03) OR If (reread value < initial value read *0.97) THEN Set ADC_FAILURE	performed at power up	1 count	Type A. MIL Illumination.
RESET_SSCHECK_FAILURE	P0606	This monitor checks if: • Defective CPU	After a warm reset the RSTCON2.CSS bits are checked. If any are 0, then the fault will be set	If (warm reset == TRUE) AND (RSTCON2.CSS == 0)	performed at power up	1 count	Type A. MIL Illumination.
SPBFAILURE	P0606	This monitor checks if: failed System Peripheral Bus	The correct value of different registers shall be tested to ensure the proper functioning of the SPB address lines. Fault set if any of the registers have an unexpected value after 5 consecutive checks in the 20 ms task .	Each of the required registers will be read during runtime to see if they provide the expected value that was loaded during initialization.	Power Switch is ON	100msec	Type A. MIL Illumination.
SMU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the SMU has been initialized it will loop through a table of SMU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the SMU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the SMU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SBCU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the SMU has been initialized it will loop through a table of SMU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the SMU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the SMU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
WDT_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	On initialization: One or more of these Safety Watchdog registers has an incorrect value: WDTSCONO.REL WDTSCON1.IRO WDTSCON1.IR1 WDTSCON1.DR WDTSCON1.UR WDTSCON1.TCTR During runtime: One or more of these CPUO Watchdog registers has an incorrect value for 4 consecutive checks: WDTCPUOCONO.REL WDTCPUOCON1.IRO WDTCPUOCON1.IR1 WDTCPUOCON1.DR WDTCPUOCON1.UR WDTCPUOCON1.TCTR	any register has an incorrect value for four consecutive checks	Enabled at power up	4 count	Type A. MIL Illumination.
CPU_BUS_MPU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the MPU has been initialized it will loop through a table of MPU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the MPU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the CPU_MPU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
LMU_MPU_CONFIG_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	after the MPU has been initialized it will loop through a table of MPU registers and compare each register value to the value that the MCAL has previously written to it. If there is a difference, then the MPU will be unlocked, the register updated, and then the SMU will be put back to it's previous state. The register will then be checked again. If it fails 3 times, then the CPU_MPU_CONFIG_REGISTER_READBACK_FAILURE will be set.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.
PB_MICRO_REGISTER_READBACK_FAILURE	P0606	This monitor checks if: • Defective CPU	The ECU provides the capability to ensure the data integrity of register configuration. The software shall ensure the data integrity of the register configuration and compare the calculated checksum against an expected value.	register value is not equal to test value written to it	performed at power up	1 count	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SAFETY_LIB_DETECTED_FAILURE	P0606	This monitor checks if: • Defective CPU	The library of micro safety tests are run at every power-up. If any test fails the results are stored and the system is soft reset. If after the reset, the same test or procedure fails then a SAFETY_LIB_DETECTED_FAILURE is latched	Any one Safety Test flag is reported as FAILED in two consecutive tests	Enabled at power up	1 count	Type A. MIL Illumination.
STM_PLAUSIBILITY_FAILURE	P0606	This monitor checks if: • Defective CPU	STM and TBU timers are read without interrupt between, then after 20 ms, STM and TBU elaspsed times are read without interrupt between the readings, the 2.5% error is checked and Up/down failsafe monitor function is called. The fault is continiously checked every 20 ms.	The difference between the System Timer and Time Base Unit channel 1 >= 2.5%	Enabled at power up	105 msec	Type A. MIL Illumination.
EVR_CFGMON_FAILURE	P0606	This monitor checks if: • Defective CPU	The Power Management Status Register is checked at power-up. Two configuration bits are checked. Also the EVR Active flag is checked.	If any of the checked flags are FALSE then the fault is set immediately	performed at power up	1 count	Type A. MIL Illumination.
RAM_STARTUP_MBIST_FAILURE	P0604	This monitor checks if: • Defective CPU	The micro runs a RAM self test at power-up. If a failure is detected the the BIST is rerun after a warm reset. If a failure still exists then the failed bit will be set	If the failed bit is TRUE then set the fault	performed at power up	1 count	Type A. MIL Illumination.
MD_PU_I_SENSE_COMMON_MODE_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {common mode Isense offset - zero Isense offset} is outside the normal range (+/- SPUT_ISENSE_MAX_CM_ISHIFT), this fault is set.	If the current sampled at power-up with an injected common mode I-sense offset (positive & negative together), is outside +/- maximum common mode offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_I_SENSE_NEGATIVE_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {zero Isense offset - negative Isense offset } is outside the normal range (SPUTJSENSE_MIN_NEG_ISHIFT to SPUT_ISENSE_MAX_NEG_ISHIFT), this fault is set	If the current sampled at power-up with an injected negative I-sense offset, is outside minimum to maximum negative offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.
MD_PU_I_SENSE_POSITIVE_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {positive Isense offset - zero Isense offset} is outside the normal range (SPUTJSENSE_MIN_POSJSHIFT to SPUT_ISENSE_MAX_POS_ISHIFT), this fault is set.	If the current sampled at power-up with an injected positive I-sense offset, is outside minimum to maximum positive offset range (from the zero offset reading), this fault is raised.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1 ms	Type A. MIL Illumination.
MDIEMOCCURRENCEFAULT	C0582	This monitor checks if: • Bridge FET failure • Invalid execution rate of a motor interrupt.	Compares the number of times each electric drive interrupt has occurred in a 4ms period, and sets if the interrupt count does not fall in an acceptable range	The occurrence counter of any enabled motor interrupt is outside an expected interval.	ECU is not shutting down.	1 count/4 ms	Type A. MIL Illumination.
MD_IEM_PLAUSIBILITY_FAULT	C0582	This monitor checks if: • Bridge FET failure • Invalid execution reason of a motor interrupt.	This fault sets if a motor control interrupt is executed with the wrong proirity level, or an interrupt is executed when it should be disabled.	Either a motor interrupt has been executed which wasn't explicitly enabled.	Motor Drive is in either "Running" or "Paused" state (i.e. not in "Init" or intermediate "Resuming" or "Terminated" state)	1 count	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_1_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 1 voltage is high, the microcontroller shall capture {M1_PH1_SEN phase voltage high}, if {M1_PH1_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on. Motor PWM is on	18 msec/128 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_MOTOR_PHASE_VOLTAGE_1_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 1 voltage is low, the microcontroller shall capture {M1_PH1_SEN phase voltage low}, if {M1_PH1_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on. Motor PWM is on	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_2_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 2 voltage is high, the microcontroller shall capture {M1_PH2_SEN phase voltage high}, if {M1_PH2_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_2_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 2 voltage is low, the microcontroller shall capture {M1_PH2_SEN phase voltage low}, if {M1_PH2_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised. Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_3_HIGH_FAULT	C057F	This monitor checks if: Bridge FET failure	When phase 3 voltage is high, the microcontroller shall capture {M1_PH3_SEN phase voltage high}, if {M1_PH3_SEN phase voltage high} is less than RT_PHASE_VOLTAGE_HIGH_MIN then this fault is raised. Motor Phase Voltage HIGH Test is executed when the Inverter FET is switched on. IF motor phase <n> voltage < PHASE VOLTAGE THRESHOLD HIGH THEN faulty bucket is incremented	M1_PH1_SEN phase voltage high < 3.46V	executed when the Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.
MD_MOTOR_PHASE_VOLTAGE_3_LOW_FAULT	C0580	This monitor checks if: Bridge FET failure	When phase 3 voltage is low, the microcontroller shall capture {M1_PH3_SEN phase voltage low}, if {M1_PH3_SEN phase voltage low} is greater than RT_PHASE_VOLTAGE_LOW_MAX then this fault is raised. Motor Phase Voltage LOW Test is executed when the lower Inverter FET is switched on. IF motor phase <n> voltage > PHASE VOLTAGE THRESHOLD LOW THEN faulty bucket is incremented	M1_PH1_SEN phase voltage low > 0.99V	executed when the lower Inverter FET is switched on.	18 msec/128 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_PHASE_1_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_PHASE_1_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 1 voltage is near to Ov,before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_PHASE_2_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_PHASE_2_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 2 voltage is near to Ov,before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_PHASE_3_STUCK_HIGH_FAULT	C057F	This monitor checks if: • Top FET shorted • Top FET drive stuck on or • Phase sense stuck high	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if high raise fault	If the motor phase 1 voltage is near to battery level, before the bridge is activated, probably caused by a short circuit top motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_PHASE_3_STUCK_LOW_FAULT	C0580	This monitor checks if: • Bottom FET shorted • Bottom FET drive stuck on or • Phase sense stuck low	Prior to initialising and enabling the bridge driver a power up test shall be performed to check no top or bottom FET is short circuit Drive stage power up tests confirm that with all FETs off, no phases are driven, Phase voltages checked against expectation, if low raise fault	If the motor phase 3 voltage is near to Ov,before the bridge is activated, probably caused by a short circuit bottom motor FET, the fault is raised.	Battery/link between 7.1v and 18v	400 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_BH1_UV_FAULT	C0580	This monitor checks if: • ECU hardware failure	Bridge driver boostrap high side 1 capacitor under voltage fault reported during Bridge driver configuration.	With bridge enabled and SOFF off, the FET IL1 is driven for 200us. After 200us, "high side buffer capacitor 1 under voltage" error in internal error register is still set.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_PU_BRIDGE_ERR_STUCK_HI_ FAULT	C0582	This monitor checks if: • Bridge Driver ERR line connectivity • Bridge driver incorrect operation.	Verify Error line goes active (low), when error condition is injected.	During self test, the Bridge Driver HW error output pin (IOHWAB_BRIDGE_1_ERROR) was not active, when Current Sense Amplifier 1&2 - Gain 2 was set to a invalid value	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	32 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_ERR_STUCK_LO_FAULT	C0582	This monitor checks if: • Bridge Driver ERR signal connectivity.	Verify Error line goes inactive (high), when injected error condition is removed.	When Bridge configuration is started by driving the HW output Pin (IOHWAB_BRIDGE_1JNHIBIT) inactive, the HW Input Pin (IOHWAB_BRIDGE_1_ERROR) stays active.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	20 - 30ms	Type A. MIL Illumination.
MD_PU_BRIDGEJ NIT_TIMEOUT_FAULT	C0582	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	Verify Bridge Driver initialization completed within SPUT_DRV_INIT_MAX_TIME.	If initialization of the bridge driver does not occur within 100ms @ 1ms /bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_BRIDGE_MAX_POWER_DOWN_FAULT	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Allow only BD_PU_MAX_POWER_DOWN_CYCLES of retry, during Bridge Driver power up sequence.	the number of power down cycles during a bridge driver power up sequence exceeds 3	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_PU_BRIDGE_OC_TIMEOUT_FAULT	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify intermediate over current tests are completed within SPUT_DRV_OVER_CURRENT_MAX_TIME.	Immediate overcurrent tests are not completed within 10ms @ 0.1us/bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 counts/2ms	Type A. MIL Illumination.
MD_PU_BRIDGE_OCT_NOT_COMPLETED	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify over current test is completed within SPUT_DRV_OCT_MAX_EXECUTION_TIME.	overcurrent tests are not completed within 50ms @ 0.1us/bit	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 counts/2ms	Type A. MIL Illumination.
MD_PU_BRIDGE_UNACCEPTABLE_ERR	C0582	This monitor checks if: • Incorrect Bridge Driver operation	Verify no un-acceptable errors are reported by Bridge device during power up.	If the below unacceptable error bits are set. - Global test mode (gtm) - Overvoltage Internal Regulator 6 Error (err_ov_reg6) - Charge Pump 1 Overload Error(err_cp1) - Charge Pump 2 Overload Error (err_cp2) - Overtemperature Shutdown (sd_ot) - Charge PumpOvervoltage Shutdown at Pin CB or Pin CH2-CL2 (sd_ov_cp), - Vs Path Charge Pump Input Overload (sd_cp1), - Overtemperature Detection (err_ot_w) - Latent Fault Warning (lfw) - Error Correction of Control Register Failed(ctrl_reg_invalid), - err_ov_ld_vdh in External Errors.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 counts/3ms	Type A. MIL Illumination.
MD_PU_ISENSE_ZERO_OFFSET_FAULT	C0596	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	Zero 1sense outside valid range The microcontroller shall test that while M1JTP (positive) offset is inactive and M1_ITN (negative) offset is inactive, M1_ISENSE_1 (zero I-sense offset) is within SPUT_ISENSE1_OFFSET_MAX_ERROR	zero Isense offset (M1_ISENSE_1) is outside the normal range	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_MCU_FET_OP_STUCK_ON_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	While bridge driver is enabled and prior to driving top or bottom FETs a power up test shall be performed to check no top or bottom FET is stuck on Turn all FETs off (MCU outputs off, bridge should drive FETs off) Monitor phase voltage whether is high/low	Top and Bottom FET stuck on during a Power up test. (Phase voltage is high when FETs are turned OFF)	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	400 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_CONFIGSTATE_CHG_FAULT	C0594	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	This failsafe guarantees that the bridge driver is in an acceptable mode (Normal, Safe Off, Config, or Error) during the power-up test sequence. Unknown, Idle, Config Lock, Self Test, Rectification, and Sleep modes will cause this fault to latch.	Bridge Driver remains in "Idle Mode" for 5ms in which it was expected that it transits to "Configuration Mode", after the configuraion has been sent via SPI.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	145 ms	Type A. MIL Illumination.
MD_PU_BRIDGE_OVER_CURRENT_FAULT	C0590	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	This failsafe tests that over current detection on the bridge driver is working as it should. This failsafe operates during the power-up test.	Self test was started and Current Sense Amplifier 1&2 - Gain 2 was set to a invalid value and bridge driver error output pin (IOHWAB_BRIDGE_1_ERROR) was active, but over current fault bit was not set in sBridgeDriver.CurrentSenseAmpErrorStatus. OR Self test was startedandCurrent Sense Amplifier 1&2 - Gain 2 was set to a valid value and bridge driver error output pin (IOHWAB_BRIDGE_1_ERROR) was inactive, but over current fault bit was set in sBridgeDriver.CurrentSenseAmpErrorStatus.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	40 msec	Type A. MIL Illumination.
MD_MOTOR_OPEN_PHASE1_FAULT	C0591	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 1 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm..400rpm): average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID_OPEN—PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN_PHASE_DIAG_EN) AND • ECU assist enabled	4 counts/4ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_MOTOR_OPEN_PHASE2_FAULT	C0591	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 2 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm..400rpm): average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID_OPEN_PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 2 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN_PHASE_DIAG_EN) AND • ECU assist enabled	4 counts/4ms	Type A. MIL Illumination.
MD_MOTOR_OPEN_PHASE3_FAULT	C0591	This monitor checks if: • Open Phase	d-axis and q-axis demand is compared with phase 3 measured current, if difference is less than threshold and if actual current is less then threshold, raise a fault	Low Speed Detection (0rpm..400rpm): average D-axis current errors (over last 12 samples in 200ps cycle) > 6A (ID_OPEN_PHASE_ERR_THRESHOLD) AND maximum of phase current amplitude > 10A (PHASE_CURRENT_DIAG_ENABLE)AND last 3 samples A1 or C1 < 0.5A (ZERO CURRENT SAMPLE THRESHOLD) AND motor phase 3 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD) High Speed Detection (400rpm..2400rpm): last 4 samples of Q-axis current demand > 10A (CURR DEM THRESHOLD) AND motor phase 1 current < 1A (ZERO_PHASE_CURRENT_THRESHOLD)	• NOT in Motor Open Phase Back-Up Mode AND • motor mechanical speed < 2400 rpm (MAX_MECH_SPD_OPEN_PHASE_DIAG_EN) AND • ECU assist enabled	4 counts/4ms	Type A. MIL Illumination.
MD_MOTOR_I_SENSE_DYNAMIC_COMM_MODE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If ({common mode I-sense offset}—{zero I-sense offset}) is outside RT_ISENSE1_MAX_CM_ISHIFT_RANGE then this fault is raised. reference value is taken before applying both voltage offsets (Common), diagnostic_sample point is measured, if diagnostic_sample > reference +/- threshold then raise a fault	Either current sample is outside a valid range set by the respective reference sample plus /minus [-35A (DM_ISenseRtMaxCmlShiftNeg)...+35A (DMJSenseRtMaxCmIShiftPos)]	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.
MD_MOTOR_I_SENSE_DYNAMIC_POSITIVE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {M1_ISENSE1 positive offset current} is outside expected limits then this fault is raised. reference value is taken before applying positive voltage offset (P), diagnostic_sample point is measured, if reference is not saturated and if diagnostic_sample < reference + threshold then raise a fault	the absolute current sample during test is lower than the induced offset	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_MOTOR_I_SENSE_DYNAMIC_NEGATIVE_FAULT	C0582	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	If {M1_ISENSE1 negative offset current} is outside expected limits then this fault is raised. reference value is taken before applying negative voltage offset (N), diagnostic_sample point is measured, if reference is not saturated and if diagnostic_sample > reference + threshold then raise a fault	the absolute current sample during test is lower than the induced offset	• ECU assist enabled AND • ECU is not initializing or shutting down	4count/16ms	Type A. MIL Illumination.
MD_MOTOR_POSITION_SENSOR_FAULT	C058A	This monitor checks if: • The MPS indicates a failure or a "not normal" mode • The MPS has detected an internal problem • The SPI message has a CRC failure • The motor position data is not in the valid range	SPI error bits set during communication with MPS, or CRC error detected in SPI message.	mode_not_normal or fail bits set, incorrect CRC calculation, or invalid MPS data	• ECU is not shutting down.	5 msec	Type A. MIL Illumination.
MD_MOTOR_POSITION_MISSING_CALIB_FAULT	C2A1C	This monitor checks if: • Malfunctioning MPS • Unpowered MPS	The motor position sensor electrical offset calibration has failed or has not yet been completed	• Fail if motor position calibration state = MPS_CALIB_OFF, MPS_CALIB_FAILED_VARIANCE, or MPS_CALIB_FAILED_FORWARD • Pass if motor position calibration state = MPS_CALIB_COMPLETED	• ECU is not shutting down.	1 ms	Type A. MIL Illumination.
MD_MOTOR_POSITION_SENSOR_EEPROM_FAULT	C058A	This monitor checks if: • Malfunctioning MPS • Unpowered MPS	- SPI error bits set during communication with EEPROM on MPS sensor, or incorrect data fingerprint found in EEPROM data read from sensor	o QSPIO_STATUSbit 3 or bit 6 are set during communication with EEPROM o EEPROM identification page[0] != 0x20 || EEPROM identification page[1] != 0x00 || EEPROM identification page[2] != 0x09	N/A	1 count	Type A. MIL Illumination.
MD_ISENSE_CROSS_CHECK_FAULT	C0582	This monitor checks if: • Current Sense Circuitry	The microcontroller shall capture M1_ISENSE1 and M1_ISENSE2 current samples, if average difference between M1JSENSE1 and M1JSENSE2 over five samples is greater than RT_ISENSE_CROSS_CHECK_LIMIT, then this fault is raised and assist removed reads two independent ADC by 5 samples and averages it to measure current flow and compares, if difference is more than allowed,	The sum of the error between phase current samples (internal and external amplifier) is not in the range [-47A (MIN_ISENSE_DIFFERENCE) ...+47A (MAX_ISENSE_DIFFERENCE)] OR no new data from current sensors received	• ECU assist enabled AND • ECU is not initializing or shutting down	20 counts/80ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_IEM_SEQUENCE_ERROR_FAULT	C0595	This monitor checks if: • Interrupt failure	Motor Control tasks are deemed to not be executing in the correct order. For every configured interrupt, read out any complete sequences that are in the log. For each sequence read out, the CRC is calculated for the observation points, and is compared against the expected value for that interrupt/mode. Mode is determined from the first observation point in the sequence. A fault is raised when there is a mismatch and the CRC check is stopped for that interrupt.	Whenever a motor interrupt is entered and exited, everytime it writes a unique number into a rolling buffer. The diagnostic calculates the CRC over complete interrupt sequences (depending on the motor state) in the buffer and raises a fault if there is a mismatch.	• ECU is not shutting down	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CLOCK_FAIL_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports internal clock failure (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND • In register shutdown error "Internal Clock Supervision Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CONFIG_COMP_FAULT	C0595	This monitor checks if: • Bridge Driver incorrect operation.	To ensure correct configuraiton data is written into Bridge Driver IC. Configuration failure detection is required in order to mitigate: - Micro controller SPI failure. - Bridge Driver failure..	During initialization, if Bridge Driver state changes to CONFIG_LOCK, report config invalid fault.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 counts/3ms	Type A. MIL Illumination.
MD_BRIDGE_CONFIG--ERROR_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports config error (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) AND • SPI status "config valid" bit is not set AND • the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CONFIG_INVALID-FAULT	C0595	This monitor checks if: • Incorrect CRC transmitted during initialisation. • Micro controller SPI failure. • Bridge Driver failure.	During initialisation, if Bridge Driver state changes to CONFIG_LOCK, report config invalid fault.	Bridge Driver has entered the "Configuration Lock Mode" during configuration.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_CONFIG_STALLED—FAULT	C0595	This monitor checks if: • Micro controller SPI failure. • Bridge Driver failure.	Verify configuration check is completed within BRIDGE—DRV_CFG_STALLED_TIMEOUT.	Bridge Driver configuration data check was not completed within 20ms.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	200 ms	Type A. MIL Illumination.
MD_BRIDGE_CB_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time, the Bridge Driver reports charge pump buffer under voltage error on the CB pin of the Bridge driver ASIC (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "CB undervoltage shutdown" is set AND In register internal error "CB undervoltage detection error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CF_BRIDGE_CONFIG_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	• bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) AND • SPI status "config valid" bit is not set AND • the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/Ims	Type A. MIL Illumination.
MD_BRIDGE_CF_BRIDGE_ECC_FAULT	C0595	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CF_REG1_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bad Motor Driver Circuit • Bad motor driver ASIC • Bad motor	During run time Bridge Driver reports error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 1 error" is set AND the fault has occurred only once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_REFERENCE_VOLTAGE_FAULT	C0580	This monitor checks if: • Micro controller • Bridge Driver amplifier reference voltage ADC failure.	Verify Bridge Driver reference voltage is within limits.	HW Pin for reference voltage (IOHWAB_BRIDGE_1_REF_VOLTAGE) is not between 2.25V and 2.75V.	• ECU provides assist AND • No safe state on bridge driver	18ms/128 counts	Type A. MIL Illumination.
MD_BRIDGE_3V3_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	Monitor Bridge Driver reporting under voltage error on its VCC (V3V3) pin.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VCC Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_3V3_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver is reporting over voltage on its VCC (V3V3) pin.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VCC Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/Ims	Type A. MIL Illumination.
MD_BRIDGE_ERR_STUCK_LO_FAULT	C0582	This monitor checks if: • Bridge Driver ERR line connectivity • Bridge driver incorrect operation.	Check M1_BD_ERR line state.	During self test, the bridge driver error output pin is active (|0HWAB_BR|DGE_1_ERR0R), when Current Sense Amplifier 1&2 - Gain 2 (=BD_REG_OP_GAI_2) was set to a valid value.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 msec	Type A. MIL Illumination.
MD_BRIDGE_VS_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation • Battery Voltage	During run time Bridge Driver reports VS over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "Vs Overvoltage Shutdown" is set OR In register external error "Vs Overvoltage Detection Error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_VS_UNDER_VOLTAGE_A_FAULT	P0562	This monitor checks if: • Low battery voltage	Bridge driver will detect undervoltage condition. The software shall interrogate the Bridge Driver to determine whether the fault is valid and if valid raises the fault.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "Vs Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver	18ms/128 counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MD_BRIDGE_VS_UNDER_VOLTAGE_B_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports VS under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_VSU_UV_DETECT—THRESHOLD.	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external errors "VS Undervoltage Detection Error" is set AND battery voltage is >= 6.5V.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_VOLTAGE_TOO_HI_EVENT	P0563	This monitor checks if: High battery voltage	Bridge voltage state is checked to see if it is normal. Then is checked for sustained abnormal battery voltage. If battery voltage is higher than high pause threshold for high pause holdoff period, and the transient over voltage threshold is not in use (bridge limit at 0%), then "too high" event is raised and bridge voltage state is changed to too high.	Voltage at bridge driver > 26.0V	• Motor power switch on AND • ENQ pin active	1 count/Ims	Type B. MIL Illumination.
MD_BRIDGE_VDHP_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation • Battery Voltage	During run time Bridge Driver reports VDHP over voltage error (using ERR line and SPI error registers).	• The voltage on the VS pin of the bridge driver ASIC is above 39.95V • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND (In register shutdown error "VDHP Overvoltage Shutdown" is set AND In register external error "VDHP Overvoltage Detection Error" is set).	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_VDHP_UV_A_FAULT	C0580	This monitor checks if: • Excessive local temperature OR failures that cause incorrect detection of over temperature.	Data read from Bridge Driver over SPI indicates an undervoltage on the VDHP pin of the Bridge Driver ASIC.	• The voltage on the VS pin of the bridge driver ASIC is below 3.96V • Bridge driver error output pin is active IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register External errors "VDHP Undervoltage Detection Error" is set	• ECU provides assist AND • No safe state on bridge driver	18msec/128 counts	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_VDHP_UV_B_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports VDHP under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_VDHU_UV_DETECT_THRESHOLD.	• The voltage on the VS pin of the bridge driver ASIC is below 3.96V • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register External errors "VDHP Undervoltage Detection Error" is set AND battery voltage is > 6.5V.	• ECU provides assist AND • No safe state on bridge driver	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_UNDEFINED_ERROR_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time SPI error status flag OR Bridge ERR line is active, but no faults are reported in SPI error registers.	Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set	• ECU provides assist AND • No safe state on bridge driver	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_UNEXPECTED_MODE_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver reports unexpected state.	Below conditions are not satisfied. ((sBridgeDriver.ICMode == BRDG_NORMAL_OPERATION) || (sBridgeDriver.State == BD_SHUTDOWN) || ((sBridgeDriver.ICMode == BRDG_ERROR_MODE) && (IOHWAB_BRIDGE_1_ERROR == ACTIVE)))	• ECU provides assist AND • No safe state on bridge driver	16 counts/ 16ms	Type A. MIL Illumination.
MD_BRIDGE_UNEXPECTED_STATE_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Verify Bridge driver state is as expected during initialisation.	Bridge driver mode is not at the expected state during configuration.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	3 counts / 3 ms	Type A. MIL Illumination.
MD_BR|DGE_SOFF_STUCK_LO_FAULT	C0582	This monitor checks if: • M1_BD_SOFF signal not working correctly.	Check bridge driver status is reported as "normal" mode" when M1_BD_SOFF is inactive.	When bridge test pin (IOHWAB_BR|DGE_1_ TEST) is driven active, bridge driver state (sBridgeDriver.State) did not change to BD_NORMAL.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 counts /2ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_SPI_MSG_FAILED_FAULT	C0595	This monitor checks if: • Bridge Driver incorrect operation • Microcontroller SPI failure.	Bridge Driver reports SPI errors (using SPI error registers) OR received SPI message CRC is invalid.	("SPI error flag" is set in SPI status AND Either "Invalid Address Access", "SPI Time-out", "SPI Frame error", "SPI Time-out", "SPI CRC error" is set in SPI communication and configuration error register) OR Invalid SPI response is received.	Ignition State = ON OR Wake ON CAN	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_SPI_RESP_TIMEOUT_FAULT	C0595	This monitor checks if: • Incorrect low level SPI driver operation.	Verify Bridge Driver low level SPI communication is working.	Low level SPI driver is not responding.	(Ignition State = ON OR Wake ON CAN AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_REG_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports internal regulator under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_IRU_UV_DETECT_THRESHOLD.	• Bridge Driver internal regulator voltage < 6.5V @1/256V/bit • Bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "Undervoltage Internal Regulator 4 or 5 or 6 Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_REG1_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports Internal regulator over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 1 error" is set AND the fault has occurred only once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_REG6_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports Internal regulator over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal errors "overvoltage internal regulator 6 error" is set	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_RECONFIGURED_EVENT	C0582	This monitor checks if: • Faults detected which require reconfiguration of Bridge driver.	To indicate when Bridge driver reconfiguration was performed.	Bridge Driver reconfiguration was requested.	EcuC.rootState_active == EcuC_MotorDriveOn AND DrvStg.SafeStateRequired == FALSE AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_OVER_CURRENT_FAULT	C0590	This monitor checks if: • Bridge Driver incorrect operation.	Bridge Driver reporting amplifier over current errors.	IOHWAB_BRIDGE_1_ERROR is active OR in SPI status "error flag" is set AND In register current sense amplifier errors "err_oc_op1 or err_oc_op2 or err_oc_op3" are set.	EcuC.rootState_active == EcuC_MotorDriveOn AND DrvStg.SafeStateRequired == FALSE AND Battery Voltage > 6V AND Bridge Driver is not reporting under voltage	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE_OVER_TEMP_ERROR_FAULT	C05C2	This monitor checks if: • Excessive local temperature OR failures that cause incorrect detection of over temperature.	During run time Bridge Driver reports over temperature error (using SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register shutdown error "Overtemperature Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver	1 count/1 ms	Type A. MIL Illumination.
MD_BRIDGE—OSF_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports output stage feedback failure (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register for output stage feedback errors any error is set	• ECU provides assist AND • No safe state on bridge driver	1 count /1ms	Type A. MIL Illumination.
MDBRIDGEECCFAILFAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports ECO failure (using SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND the fault has occurred more than once in this ignition cycle.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_HS_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports high side capacitor over voltage error (using ERR line and SPI error registers).	• Bridge Driver highside capacitor voltage < 6.5V @1/256V/bit • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "High-side Buffer Capacitor 1 or 2 or 3 Overvoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_HS_UNDER_VOLTAGE_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports high side capacitor under voltage error (using ERR line and SPI error registers), but battery voltage is greater than BD_HBCU_UV_DETECT_THRESHOLD.	• Bridge Driver highside capacitor voltage < 6.5V @1/256V/bit • bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register internal error "High-side Buffer Capacitor 1 or 2 or 3 Undervoltage Detection Error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_NOT_DISABLED_FAULT	C0582	This monitor checks if: • Bridge Driver enable signal connectivity.	The microprocessor shall test that when M1_BD_ENA (bridge driver enable) is inactive, motor FETs can not be driven.	Set bridge driver HW enable Pin (IOHWAB_BRIDGE_1-ENABLE) inactive and set all three bottom FETs ON. After 100us all bottom FETS were not disabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	39 ms	Type A. MIL Illumination.
MD_BRIDGE_SOFF_NOT_DISABLED_FAULT	C0582	This monitor checks if: • Bridge Driver SOFF signal connectivity.	The microprocessor shall test that when SOFF pin is inactive, motor FETs can not be driven.	Set bridge driver HW SOFF Pin inactive and set all three bottom FETs ON. After 100us all bottom FETS were not disabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	40 ms	Type A. MIL Illumination.
MD_BRIDGE_SOFF_NOT_ENABLED_FAULT	C0582	This monitor checks if: • Bridge Driver SOFF signal connectivity.	The microprocessor shall test that whenSOFF pin is active motor FETs can be driven.	Set bridge driver HW SOFF Pin active with all three bottom FETS already ON. After 100us even one bottom FET was not enabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	30 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_LATENT_WARNING_ EVENT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	The BD has reported a 'latent fault' (over SPI)	In SPI status "SPI special event" is set AND In special events register "SPI Latent Fault Warning" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/Ims	Type A. MIL Illumination.
MD_BRIDGE_NOT_ENABLED_FAULT	C0582	This monitor checks if: • Bridge Driver enable signal connectivity.	The microprocessor shall test that when M1_BD_ENA (bridge driver enable) is active motor FETs can be driven.	Set bridge driver HW enable Pin (IOHWAB_BRIDGE_1_ENABLE) active with all three bottom FETS already ON. After 100us even one bottom FET was not enabled.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	29 msec	Type A. MIL Illumination.
MD_BRIDGE_CP_OVER_VOLTAGE_FAULT	C057F	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports charge pump over voltage error (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register external error "charge pump overvoltage detection error" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CP1_OVERLOAD_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports CP1 overload error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND (In register internal errors "Charge Pump 1 Overload Error" is set OR In register shutdown errors "Vs Path Charge Pump Input Overload" is set).	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_CP2_OVERLOAD_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports CP2 overload error (using ERR line and SPI error registers).	special event register of bridge driver indicates that error correction of control register failed AND (In register internal errors "Charge Pump 2 Overload Error" is set	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE—DDP_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	During run time Bridge Driver reports digital driving path failure (using ERR line and SPI error registers).	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register shutdown error "Digital Driving Path Stucked Shutdown" is set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_CB_UV_FAULT	C0580	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver charge pump buffer (CB) under voltage self test.	When Bridge Driver was put into CB under voltage self test mode and after 5msec, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR)	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	85 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_CSA_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver amplifier gain BIST.	When Bridge Driver was put into CSA Gain self test mode, bridge driver error output pin is not active (IOHWAB_BRIDGE_1_ERROR) OR Isense reading was not within limits.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	100 ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_CSA_VRO_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge driver CSA VRO BIST.	When Bridge Driver was put into CSA VRO self test and self test was finished, one of the CSA 1/2/3 supply over voltage/under voltage error bit was not set.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	170 ms	Type A. MIL Illumination.
MD_BR|DGE_DRV_BIST_SHORT_CCT_FAULT	C0582	This monitor checks if: • Bridge Driver short circuit detection not working.	Bridge driver built in high/low side short circuit detection test.	When Bridge Driver was put into short circuit test mode and FET was driven, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR) OR Short circuit error bits were not set in register OR High-side 1/2/3 Drain Source Measurement were not at expected value.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	180 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_BRIDGE_DRV_BIST_TIMEOUT—FAULT	C0582	This monitor checks if: • Bridge Driver BIST not working correctly.	Built-in selftest timeout.	Bridge Driver built in self test was not completed within 100msec.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	1 count/1ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_BIST_VCC_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	Perform Bridge Driver's VCC built in self test.	When Bridge Driver was put into VCC self test mode, bridge driver error output pin was not active (IOHWAB_BRIDGE_1_ERROR) OR VCC under voltage error bit was not set in external error register	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 counts/50ms	Type A. MIL Illumination.
MD_BRIDGE—DRV_INHIBIT—FAULT	C0582	This monitor checks if: • Bridge Driver inhibit signal connectivity • Bridge Driver incorrect operation.	Verify Bridge Driver will be in SLEEP mode, if Bridge driver is inhibited.	When HW inhibit Pin (IOHWAB_BRIDGE_1JNHIBIT) is active, the bridge driver operation mode register did not indicate that it is in the expected Sleep Mode.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2counts/2ms	Type A. MIL Illumination.
MD_BRIDGE_DRV_WAKE_UP_FAULT	C0582	This monitor checks if: • Bridge Driver inhibit signal connectivity • Bridge Driver incorrect operation.	Remove Bridge inhibit and verify SPI comms is started and Bridge Driver state changes to IDLE.	When HW inhibit Pin (IOHWAB_BR|DGE_1-INHIBIT) is driven inactive, the bridge driver operation mode register did not transit from Sleed Mode to the expected Idle Mode.	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2counts/2ms	Type A. MIL Illumination.
MD_BRIDGE_SHORT_CIRCUIT_FAULT	C0582	This monitor checks if: • Bridge Driver incorrect operation.	This failsafe checks the SPI communication from the bridge driver to see if it is reporting a short circuit fault. This failsafe operates at run-time	bridge driver error output pin is active (IOHWAB_BRIDGE_1_ERROR) OR the SPI status "error flag" is set AND In register Short Circuit Errors any of the "Short Circuit at High/Low-side 1 or 2 or 3" are set.	• ECU provides assist AND • No safe state on bridge driver Note: ECU provides assist includes that the measured battery voltage is above 6V and that there is no undervoltage reported from the bridge driver internal voltage monitoring.	3 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MOTOR_DEMAG_WARN	C05C2	This monitor checks if: Motor magnet over temperature.	Motor magnet temperature is greater than threshold.	Sets when the estimated motor magnet temperature is > 140°C	Power ON, Continuous Failsafing	5 msec	Type A. MIL Illumination.
MOTOR_DEMAG_FAIL	C05C2	This monitor checks if: Motor magnet over temperature.	Motor magent temperature is greater than threshold.	Sets when the estimated motor magnet temperature is>160°C	Power ON, Continuous Failsafing	20 msec	Type A. MIL Illumination.
MOTOR_OVER_TEMP_WARN	C05C2	This monitor checks if: Motor winding over temperature.	Motor winding temperature is greater than threshold.	Sets when the estimated motor winding temperature is>190°C	Power ON, Continuous Failsafing	20 msec	Type A. MIL Illumination.
MOTOR_OVER_TEMP_FAIL	C05C2	This monitor checks if: Motor winding over temperature.	Motor winding temperature is greater than threshold.	Sets when the estimated motor winding temperature is > 220°C	Power ON, Continuous Failsafing	20 msec	Type A. MIL Illumination.
MD_PU_BR|DGE_PIR_CLOSE1_LSD_FAULT	C0580	This monitor checks if: o Bridge driver disabled o Bridge driver in safe off mode o Bridge driver malfunctioning	■Driven phase is detected as not low when it should be driven low.	■Driven phase voltage > 1.2V when < 1.2V expected	Battery voltage between 7.1v and 18v AND Motor rotating below +/-8.3mrev/s	2 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MD_PU_BRIDGE_PIR_CLOSE1_OPEN_CCT_FAULT	C0580	This monitor checks if: o Open motor phase -Due to connector signals open -Due to open within ECU motor circuit -Due to open within ACU motor circuit	Non-driven phase voltages not pulled low while FETs are driven closed.	- phase voltage > 1.2V when < 1.2V expected	• If MD_PU_BRIDGE_PIR_CLOSE1_LSD_FAULT detects, this fault will not detect.	2 msec	Type A. MIL Illumination.
SCP1_CORRELATION_ERROR	C0574	This monitor checks if: SCP1 signal failure	The SCP1,SCP2 and PTS sensor signals are used to compare and identify a single failed sensor signal. This fault is set if the difference exceeds the error threshold value.	|SCP_1 - SCP_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
SCP2CORRELATIONERROR	C0574	This monitor checks if: SCP2 signal failure	The SCP1.SCP2 and PTS sensor signals are used to compare and identify a single failed sensor signal. This fault is set if the difference exceeds the error threshold value.	|SCP_1 - SCP_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
SCP1_OFFSET_ERROR	C0574	This monitor checks if: SCP1 signal failure	The offset required to zero the Secondary circuit pressure sensor is larger than the specification limit.	|SCP_1_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake,	100 ms Goal: 18000	Type A. MIL Illumination.
SCP2_OFFSET_ERROR	C0574	This monitor checks if: SCP2 signal failure	The offset required to zero the Secondary circuit pressure sensor is larger than the specification limit.	|SCP_2_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake,	100 ms Goal: 18000	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BP_MODEL_TOO_HIGH_ERROR	C053D	This monitor checks if: Common cause Boost Pressure Sensor failure (in-range high)	The system models an expected boost pressure based on motor position change. This fault indicates that the boost pressure sensor indicates higher pressure than predicted by the model and than evidenced by the vehicle deceleration.	• Valid braking request (driver or autonomous) • BP_Model (MPS) < Boost pressure - 50 Bar • Vehicle deceleration is not observed	• Signal valid; • No ABS; • vehicle at speed and is slowing down. • driver not on throttle and requested enough pressure	500 ms Goal:18000	Type A. MIL Illumination.
BP_MODEL_TOO_LOW_ERROR	C053D	This monitor checks if: Common cause Boost_P failure (in-range-low)	The system models an expected boost pressure based on motor position change. This fault indicates that the boost pressure sensor indicates lower pressure than predicted by the model and than evidenced by the vehicle deceleration.	• Valid braking request (driver or autonomous) • BPJModel (MPS) > Boost pressure + 5 Bar • Vehicle deceleration is observed	• Signal valid; • No ABS; • DAP close to end position; • vehicle at speed not slowing down much; • driver not on throttle and requested enough pressure	500 ms Goal:18000	Type A. MIL Illumination.
BP1CORRELATIONERROR	C053D	This monitor checks if: BP1 signal failure	The BP1, BP2, and DAP position signals are used to compare and identify a single failed sensor signal	|Boost_P_1 - Boost_P_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
BP2_CORRELATION_ERROR	C053D	This monitor checks if: BP2 signal failure	The BP1, BP2, and DAP position signals are used to compare and identify a single failed sensor signal	|Boost_P_1 - Boost_P_2| > 5 Bar	Input signals valid for some time (allow system/signal to initialize)	125-500 ms 18000 Counts	Type A. MIL Illumination.
BP_RAW_OFFSET_ERROR	C053D	This monitor checks if: Boost Pressure Sensor Failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit of 50 bar.	|BP_RAW_Off| > 50 BAR	• Input signal valid; • Driver request, DAP position, suggest there should be no pressure; • Vehicle acceleration, vehicle at speed.	500 ms Goal:18000	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BP1_OFFSET_ERROR	C053D	This monitor checks if: BP1 signal failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit	|BOOST_P_1_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100 ms Goal: 18000	Type A. MIL Illumination.
BP2_OFFSET_ERROR	C053D	This monitor checks if: BP2 signal failure	The offset required to zero the Boost Pressure sensor is larger than the specification limit	|BOOST_P_2_Off| > 10 Bar	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100 ms Goal: 18000	Type A. MIL Illumination.
MCPRESSENERRATIC	C053D	This monitor checks if: • Intermittent failure of the pressure sensor. • Intermittent open or short in the internal circuitry of the printed circuit board.	• Pressure Sensor Erratic • This diagnostic checks both raw Boost Pressure principle and reference signals.	Ohmic Status Faulted = Sensor open or shorted to sensor supply (conditions for MC_PRES_SEN_OPEN_OR_SHRT_HIGH) or Sensor shorted to ground (conditions for MC_PRES_SEN_SHORTED_LOW) Fault counts toward setting each time Ohmic Faulted status changes from Passed to Faulted or from Faulted to Passed.	• Sensor voltage supply in range • Boost Pressure Sensor is enabled	80 ms Goal: 800	Type A. MIL Illumination.
MC_PRES_SEN_SHORTED_LOW	C053E	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. • Defective microprocessor feedback input port.	• Pressure Sensor Shorted Low • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage < 4.61% of principle sensor supply voltage OR reference sensor voltage < 4.85% of reference sensor supply voltage	• Sensor voltage supply in range • Boost Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
MC_PRES_SEN_OPEN_OR_SHRT_HIGH	C053F	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. • Defective microprocessor feedback input port.	• Pressure Sensor Open or Shorted High • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage > 95.24% of principle sensor supply voltage OR reference sensor voltage > 94.50% of reference sensor supply voltage	• Sensor voltage supply in range • Boost Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SC_PRES_SEN_SHORTED_LOW	C0571	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. Defective microprocessor feedback input port.	• Pressure Sensor Shorted Low • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage < 4.61% of principle sensor supply voltage OR reference sensor voltage < 4.85% of reference sensor supply voltage	• Sensor voltage supply in range • Secondary Circuit Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
SC_PRES_SEN_OPEN_OR_SHRT_HIGH	C0572	This monitor checks if: • Defective pressure sensor. • Defective pressure sensor connector. • Defective printed circuit board. Defective microprocessor feedback input port.	• Pressure Sensor Open or Shorted High • This diagnostic checks both raw Boost Pressure principle and reference signals.	principal sensor voltage > 95.24% of principle sensor supply voltage OR reference sensor voltage > 94.50% of reference sensor supply voltage	• Sensor voltage supply in range • Secondary Circuit Pressure Sensor is enabled	100 ms	Type A. MIL Illumination.
SC_PRES_SEN_ERRATIC	C0574	This monitor checks if: • Intermittent failure of the pressure sensor. • Intermittent open or short in the internal circuitry of the printed circuit board.	• Pressure Sensor Erratic • This diagnostic checks both raw Boost Pressure principle and reference signals.	Ohmic Status Faulted = Sensor open or shorted to sensor supply (conditions for SC_PRES_SEN_OPEN_OR_SHRT_HIGH) or Sensor shorted to ground (conditions for SC_PRES_SEN_SHORTED_LOW) Fault counts toward setting each time Ohmic Faulted status changes from Passed to Faulted or from Faulted to Passed.	• Sensor voltage supply in range • Secondary Circuit Pressure Sensor is enabled	80 ms Goal: 800	Type A. MIL Illumination.
PRESSURE_SENSOR_MISSING_CALIBRATION	C0560	This monitor checks if: • Missing Calibration • NVRAM error	This fault only checks if the EOL calibration is sucessful or not. If the calibration was not yet done or if the calibration is not successful, then this fault is set. The NVRAM contains both calibrated offset and status, but only the status is checked to set the fault.	status != SUCCESSFUL	Any time after system wake up and read NVRAM	500 ms Goal:18000	Type A. MIL Illumination.
SWAGAINERROR	C0051	This monitor checks if: • Defective steering angle sensor. • Defective cable. • Defective printed circuit board. • Defective microprocessor feedback input port.	• Steering Wheel Angle Sensor - Gain Error • The monitoring recognizes offset faults as well as amplification fault.	Tight Check: Difference between zeroed measured SWA signal and estimated SWA signal > Tight Check threshold Tight check threshold is based on a function of vehicle speed, Ay and Yaw Rate with minimum threshold of 50 deg. Loose Check: Difference between zeroed SWA signal and estimated SWA signal > Loose Check threshold Loose check threshold is based on a function of vehicle speed, Ay and Yaw Rate with minimum threshold of 100 deg.	1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid 2. MCP is initialized 3. Vehicle speed > 4.0 m/s while driving forward 4. Emissions Rolls Test Inactive Tight Check: 1. Driving is stable Loose Check: 1. Driving is marginally stable	If SWA gain error= 2*threshold Goal: 900 ms else Goal: 1.8 s	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SWAOFFSETERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor • mechanical attachment of the sensor • incorrect wheel geometry	• Steering Angle Sensor - Offset Error • The SWA signal shows an offset out of specification.	Before Initialization: High offset: (Learned offset-Stored End of line offset from NVRAM) > 23° Low offset: (Learned offset-Stored End of line offset from NVRAM) > 18° After Initialization: (Learned offset-Stored End of line offset from NVRAM| > 18°	1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid 2. MCP is initialized 3. Vehicle speed > 4.0 m/s while driving forward 4. Emissions Rolls Test Inactive Tight Check: 1. Driving is stable Loose Check: 1. Driving is marginally stable	Before initialization: High offset: 100 ms Low offset: 1.8 s After Initialization: 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SWARAWOFFSETERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor • mechanical attachment of the sensor • incorrect wheel geometry	• Steering Wheel Angle Sensor - Raw Offset • The SWA signal has to show an implausible high value before the initialization.	Difference between measured SWA and estimated SWA > 175° ABS(ABS(Yaw_Rate.Conv_To_Swa_s16) - ABS(Swa.Turn_Corrected_Delayed_s16)) > SWA_RAW_0FFSET_ERR0R_THR_S16 SWA_RAW_OFFSET_ERROR_THR_S16= 175 deg	1. Yaw Rate, Lat Acc, SWA and wheel speed info are valid 2. MCP is initialized 3. Vehicle speed > 4.0 m/s while driving forward 4. Emissions Rolls Test Inactive Tight Check: 1. Driving is stable Loose Check: 1. Driving is marginally stable	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SWAMAXVALUEERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor • mechanical attachment of the sensor • Incorrect wheel geometry	• Steering Angle Sensor - Max Value Error • The SWA signal shows a greater value than physically possible in the vehicle.	Absolute SWA sensor: |Swa Turn Corrected) > 720° OR Relative SWA sensor: |Swa Turn Correctedl > 1440° before initialization OR Relative SWA sensor: |Swa zeroed) > 720° after initialization	1. SWA is valid and calibrated 2. Emissions Rolls Test Inactive	200 ms OR 200 ms before initialization OR 200 ms after initialization	Type C, No MIL, "Emissions Neutral Diagnostic "
SWA_NOT_ALIVE_ERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor hardware	• Steering Wheel Angle - Not Alive Error,Also known as "Constant Value Fault" • The SWA signal does not change while the Yaw Rate changes:	|Yaw rate derivative) > 57s ^{2}	1. Yaw rate and SWA valid 2. Emissions Rolls Test Inactive 3. Wheel speed information valid 4. Vehicle speed > 2.5 m/s 5. Difference between wheel speeds front and rear ? 5 m/sec 6. Difference between measured and estimated Yaw rate < 67s 7. Yaw Rate has to be > 37s once and < -37s once	3 s	Type C, No MIL, "Emissions Neutral Diagnostic "
SWASTEPERROR	C0051	This monitor checks if: • electronic or mechanical fault in sensor hardware	• Steering Wheel Angle Sensor - Step Error • The SWA signal has to show a gradient above a certain threshold.	Raw SWA signal change > 30007s Set previous signal for next cycle.	1. SWA is valid 2. Emissions Rolls Test Inactive	50 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
LAT_SENSOR_NOT_ALIVE_ERROR	C0061	This monitor checks if: • electronic fault in sensor	• Lat Acceleration Sensor - Not Alive Fault • The Lat Acc signal does not change or is locked at a rail value. • This failure is set if the lateral acceleration sensor is not able to change its value anymore or if it is outside the specified max range.	1. lat acc signal ? +/- 25 m/s^2 OR 2. Lat Acc is constant lat acc signal < +/- 14 m/s^2 AND Vehicle Speed > 3 m/s^2	Emissions Rolls Test Inactive AND 1. Lat Acc is valid Wheel speed is valid vehicle speed > 3 m/s^2	1. 1 s 2. 100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_SENSOR_STEP_ERROR	C0061	This monitor checks if: • electronic fault in sensor • mechanical mounting of sensor	• Lat Acceleration Sensor - Step Error • The Lat Acc signal has to show a gradient above a certain threshold.	Raw Lat Acc signal change is > 800 m/s^3	Lat accel is valid ABS is not active	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_SENSOR_RAW_OFFSET_ERROR	C0061	This monitor checks if: • Sensor Open • Open circuit in ECU in series with sensor input	• Lat Acceleration Sensor - Raw Offset Error • The Lat Acc signal has to show an implausible high value while standing still.	Lat Acc signal > 6.5 m/sec^2	• Lat Acc is valid • Wheel speed info is valid • Vehicle is standing still	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_SENSOR_OFFSET_ERROR	C0061	This monitor checks if: • Sensor Open • Open circuit in ECU in series with sensor input	• Lat Acceleration Sensor - Offset Error • The Lat Acc signal shows an offset out of specification.	Before Initialization: 1. 1 Continuously learned offset is > 4 m/sec^2 OR 2. 2 Continuously learned offsets > 1.8 m/sec^2 for 4 sec WHILE vehicle speed > 13.8 m/s OR driving distance > 150m before initialization OR 3. 3 Continuously learned offsets > 3 m/s^2 for 4 sec WHILE vehicle speed < 13.8 m/sec AND driving distance < 150 m before initialization After Initialization: 4. 8 "extended learn" offsets are > 1,8 m/s^2 (Extended learn offsets are determined while vehicle driving straight over accumulated distances on the order of 250m)	• Lat Acc valid • Yaw Rate, wheel speed information and steering angle are valid • Vehicle speed > 4.2 m/sec • Stable forward driving	1. 100 ms 2. 1.8 s 3. 1.8 s 4. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
LAT_SENSOR_GAIN_ERROR	C0061	This monitor checks if: • electronic fault in sensor	• Lat Acceleration Sensor - Gain Error • This function computes the difference between the measured ay signal and an ay estimate, based on a vehicle model. If the difference between the two is above a threshold for a certain period of time, a sensor fault is set.	1. The difference between the measured Lat Acc (zeroed) and the estimated Lat Acc is > failure threshold OR 2. The difference between the measured Lat Acc (zeroed) and the estimated Lat Acc is > two times the failure threshold The fault basic threshold is based on the initialization state: Before Initialization: 4 m/sec^2 + delta After Initialization: 2 m/sec^2 + delta Where delta is based on the driving situation, a function of vehicle speed, Yaw Rate, or steering angle. The model based on steering angle is considered to be the most robust one.	• No active Lat Accel fault • ay-signal is valid • Yaw Rate signal is valid • No active Wss faults • Vehicle-speed > 4.2 m/sec, while driving forward	1. 1.5s 2. .75 s	Type C, No MIL, "Emissions Neutral Diagnostic "
LONG_SENSOR_NOT_ALIVE_ERROR	C0551	This monitor checks if: • electronic fault in sensor	• Longitudinal Sensor - Constant Error • The Long Acc signal does not change or is locked at a rail value.	1. long acc signal >= +/- 25 m/s^2 OR 2. Long Acc is constant AND long acc signal < +/- 14 m/s^2 AND Vehicle Speed > 3 m/s^2	• Emissions Rolls Test Inactive AND • Long Acc is valid • Wheel speed is valid • vehicle speed > 3 m/sec	1. 1 s 2. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
LONG_SENSOR_STEP_ERROR	C0551	This monitor checks if: • electronic fault in sensor • mechanical mounting of sensor	• Long Acceleration Sensor - Step Error • The Long Acceleration signal has to show a gradient above a certain threshold.	Raw Long Acc signal change is > 800 m/s^3	• Long Acc is valid • ABS not active • Emissions Rolls Test Inactive	100 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
LONG_SENSOR_RAW_OFFSET_ERROR	C0551	This monitor checks if: • electronic fault in sensor • mechanical mounting of the sensor	• Long Acceleration Sensor - Raw Offset Error • The Long Acc signal has to show an implausible high value while standing still.	Long Acc signal > 8 m/s^2	• Long Acc is valid • Wheel speed info is valid • Vehicle is standing still • Emissions Rolls Test Inactive	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
LONG_SENSOR_OFFSET_ERROR	C0551	This monitor checks if: • electronic fault in sensor • mechanical mounting of sensor	• Long Acceleration Sensor - Offset Error • The Long Acc signal shows an offset out of specification.	3 continuously learned offsets are > 2.5 m/s^2	• Long Acc is valid • Wheel speed information is valid • All four wheel speeds > 3 m/s • stable forward driving • No vehicle control activities such as ABS, TC, and VSC • Emissions Rolls Test Inactive	1. 100 ms 2. 1.8 s 3. 1.8 s 4. 10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
LONG_SENSOR_GAIN_ERROR	C0551	This monitor checks if: • electronic fault in sensor	• Long Acceleration Sensor - Gain Error • This monitoring recognizes offset faults as well as amplification faults.	Change in estimated Long Acc > 0.2 m/s^2 AND Measured Long Acc-Estimated Long Acc > 0.8 m/s^2	• Long Acc and wheel speed information are valid • All four wheel speeds > 3 m/s • Stable forward driving • Accelerator position gradient < 600%/sec • Emissions Rolls Test Inactive	200 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_NOT_ALIVE_ERROR	C0063	This monitor checks if: • electronic fault in sensor	• Yaw Rate Sensor - Not Alive Error • The Yaw Rate signal does not change or is locked at a rail value.	1. Yaw rate is constant AND |Yaw rate| < 857s AND Vehicle Speed > 3 m/s^2 2. |Yaw rate| ? 1307s	• Emissions Rolls Test Inactive AND 1. Yaw Rate is valid Wheel speed info is valid Vehicle speed > 3 m/s	1. 1 s 2. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_STEP_ERROR	C0063	This monitor checks if: • defective sensor • mechanical mounting of the sensor • Stone impingement at the floor pan	• Yaw Rate Sensor - Step Error • The Yaw Rate signal has to show a gradient above a certain threshold.	Yaw rate gradient > 8007s ^{2}	• Yaw Rate is valid • Emissions Rolls Test Inactive	100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_RAW_OFFSET_ERROR	C0063	This monitor checks if: • electronic sensor fault	• Yaw Rate Sensor Raw Offset Error • The Yaw Rate signal has to show an implausible high value while standing still.	Low error threshold: If initialization info is valid and below threshold |Yaw rate| > 507s	• Yaw Rate is valid • Wheel speed info is valid • Vehicle is standing still • Emissions Rolls Test Inactive	200 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
YAW_SENSOR_OFFSET_ERROR	C0063	This monitor checks if: • electronic sensor fault	• Yaw Rate Sensor - Offset Error • The Yaw Rate signal shows an offset out of specification.	While Standing Still 1 Continously learned offset > 5 deg/sec while vehicle standing still. (Offset must remain present as vehicle driven away following statndstill condition) Before Initialization while driving: 2 learned offset is > 87s OR 3 Continuously learned offsets are > 57s for 1 s After Initialization while driving: 4 "extended learn" offsets are > 57s during straight driving (Extended learn offsets are determined while vehicle driving straight over accumulated distances on the order of 250m)	• Yaw Rate is valid • Steering angle, Lat Acc and wheel speed informaiton are valid • Vehicle speed > 4.2 m/s • Stable forward driving • Emissions Rolls Test Inactive	1. 100 ms 2. 1.8 s 3. 100 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_SENSOR_GAIN_ERROR	C0063	This monitor checks if: • electronic fault in sensor	• Yaw Rate Sensor - Gain Error • This monitoring recognizes offset faults as well as amplification faults.	1. The difference between the measured Yaw rate (zeroed) and the estimated Yaw rate is > failure threshold OR 2. The difference between the measured Yaw rate (zeroed) and the estimated Yaw rate is > two times the failure threshold The fault basic threshold is based on the initialization state: Before Initialization: 67s + delta After Initialization: 37s + delta Where delta is based on the driving situation, a function of vehicle speed, Ay, steering angle and steering angle derivative.	• Yaw Rate is valid • Steering angle, Lat Acc and wheel speed information are valid • Vehicle speed > 2.5 m/s driving forward • Emissions Rolls Test Inactive	1. 1 s 2. 500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PTS_TO_SCP_MODEL_TOO_HIGH_ERROR	C05D2	This monitor checks if: • Master cylinder seal leakage to reservoir • Pedal Simulator seal leakage to reservoir • In-range failure of SCP sensor	The BHS function includes a model of expected simulator Pressure based on driver pedal position. MODEL_TOO_HIGH_ERROR detects the situation where the modeled pressure is much higher than the measured pressure. Given certain travel, some amount of minimun pressure is expected in the SC. Otherwise something is wrong.	BHS modeled pressure > SCP Measured Pressure + 20 Bar Look up table (add lookup table to appendices)	PTS > the minimum point on the lookup table	500 ms Goal: 18000 Counts	Type A. MIL Illumination.
PTS_TO_SCP_MODEL_TOO_LOW_ERROR	C05D3	This monitor checks if: • Pedal Simulator Valve is closed or blocked • Pedal Simulator seized/fails to store fluid • In-range failure of SCP sensor	The BHS function includes a model of expected simulator Pressure based on driver pedal position. MODEL_TOO_LOW_ERROR detects the situation where the modeled pressure is much lower than the measured pressure.	BHS modeled pressure < SCP Measured Pressure - 20 Bar	The brake event is not a fast apply (which may cause unpredictable high pressure)	500 ms 18000 Counts	Type A. MIL Illumination.

<table>
<tr><th>Component/ System</th><th>Fault Code</th><th>Monitoring Strategy Description</th><th>Fault Detection Criteria</th><th>Threshold Value</th><th>Secondary Parameter and Enable Condition</th><th>Maturation Time</th><th>MIL Illumination</th></tr>
<tr><td>PTS1_OUT_OF_RANGE_ERROR</td><td>C05CC</td><td>This monitor checks if:
• Failure of PTS1
• Failure of travel sensor cursor rod</td><td>During normal operation the input piston travel is physically limited to ~25 mm, and during NO_BOOST operation it is limited to ~36 mm. The sensor is capable of measuring travel up to 43 mm. Reported travel by a single sensor in excess of these limits is indicative of a sensor error.</td><td>• PTS1 signal > 38 mm AND
• PTS2 signal and SCP signal agree that actual travel is in range

Not checking for SCP</td><td>Signal is valid</td><td>5 s
18000 Counts</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS2_OUT_OF_RANGE_ERROR</td><td>C05CF</td><td>This monitor checks if:
• Failure of PTS2
• Failure of travel sensor cursor rod</td><td>During normal operation the input piston travel is physically limited to ~25 mm, and during NO_BOOST operation it is limited to ~36 mm. The sensor is capable of measuring travel up to 43 mm. Reported travel by a single sensor in excess of these limits is indicative of a sensor error.</td><td>• PTS2 signal > 38 mm AND
• PTS1 signal and SCP signal agree that actual travel is in range

Not checking for SCP</td><td>Signal is valid</td><td>5 s
18000 Counts</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS1_STEP_ERROR</td><td>C05CC</td><td>This monitor checks if:
• Failure of PTS1 signal line</td><td>The PTS1 sensor signal changes at a physically implausible rate, resulting in a signal that disagrees with PTS2 signal, and a modeled pressure that disagrees with the SCP (i.e. PTS2 model and SCP signals agree on driver braking level, PTS1 model and SCP disagree)</td><td>• PTS1 signal gradient > 700 mm/s
• |PTS1 - PTS2| > Error_threshold
• Model(PTSI) <> SCP and Model(PTS2) == SCP</td><td>Signal is valid</td><td>50 ms
Goal: 10 Counts</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS2_STEP_ERROR</td><td>C05CF</td><td>This monitor checks if:
• Failure of PTS2 signal line</td><td>The PTS2 sensor signal changes at a physically implausible rate, resulting in a signal that disagrees with PTS1 signal, and a modeled pressure that disagrees with the SCP (i.e. PTS1 model and SCP signals agree on driver braking level, PTS2 model and SCP disagree)</td><td>• PTS2 signal gradient > 700 mm/s
• |PTS1 - PTS2| > Errorjhreshold
• Model(PTS2) <> SCP and Model(PTSI) == SCP</td><td>Signal is valid</td><td>50 ms
Goal: 10 Counts</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS1_SENT_RECEIVE_ERROR</td><td>C2A13</td><td>This monitor checks if:
PTS1 SENT data error</td><td>The PTS2 SENT message is comprised of a 12 bit data value (pedal travel), a 12 bit data value (motor position), a 4 bit CRC, and a 4 bit status field.</td><td>PTS1 data < Lower_Threshold OR
PTS1 data > Upper_Threshold OR
PTS1 upper nibbles + PTS1 lower nibbles != 4095</td><td>Any of the following conditions:
• SENT message Checksum error
• SENT status field indicates receive failure
• Received pedal travel is out-of-range low (0)
• Received pedal travel is out-of-range high (4095)</td><td>5ms</td><td>Type A. MIL Illumination.</td></tr>
</table>

<table>
<tr><th>Component/ System</th><th>Fault Code</th><th>Monitoring Strategy Description</th><th>Fault Detection Criteria</th><th>Threshold Value</th><th>Secondary Parameter and Enable Condition</th><th>Maturation Time</th><th>MIL Illumination</th></tr>
<tr><td>PTS2_SENT_RECEIVE_ERROR</td><td>C2A14</td><td>This monitor checks if:
PTS2 SENT data error</td><td>The PTS1 SENT message is comprised of a 12 bit data value, its 12 bit complement, a 4 bit CRC, and a 4 bit status field</td><td>PTS2 data < Lower_Threshold OR
PTS2 data > Upper_Threshold</td><td>Any of the following conditions:
• SENT message Checksum error
• SENT status field indicates receive failure
• Data value and its complement do not combine to OxFFF
• Received position is out-of-range low (0)
• Received position is out-of-range high (4095)</td><td>5ms</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS1_SENT_MESSAGE_MISSING</td><td>C2A13</td><td>This monitor checks if:
Signal line is open or
shorted to GND.
Shorted to supply
Wiring</td><td>The SW indicates the failure to the driver interface and set the status of the received Pedal and Motor position value to invalid within FTTD_PEDAL_MOTOR POSITION_VALUE.</td><td>N/A</td><td>N/A</td><td>5 msec</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS2_MPS2_SENT_MESSAGE_MISSING</td><td>C2A14</td><td>This monitor checks if:
Signal line is open or
shorted to GND.
Shorted to supply
Wiring</td><td>the SW indicates the failure to the driver interface and set the status of the received Pedal and Motor position value to invalid within FTTD_PEDAL_MOTOR POSITION_VALUE.</td><td>N/A</td><td>N/A</td><td>5 msec</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS1_CORRELATION_ERROR</td><td>C05D0</td><td>This monitor checks if:
PTS1 Signal Failure</td><td>The PTS1, PTS2, and BAS sensor signals are used in a 2-out-of-3 correlation scheme to identify a single failed sensor signal</td><td>• |PTS1 - PTS2| > 2 mm AND
• |PTS1 - BAS| > 2 mm AND
• |PTS2 - BAS| < 2 mm</td><td>Signal is valid</td><td>125-500 ms
18000 Counts</td><td>Type A. MIL Illumination.</td></tr>
<tr><td>PTS2_CORRELATION_ERROR</td><td>C05D0</td><td>This monitor checks if:
PTS1 Signal Failure</td><td>The PTS1, PTS2, and BAS sensor signals are used in a 2-out-of-3 correlation scheme to identify a single failed sensor signal</td><td>• |PTS1 - PTS2| > 2 mm AND
• |PTS1 — BAS| >2 mm AND
• |PTS2 — BAS) <2 mm</td><td>Signal is valid</td><td>125-500 ms
18000 Counts</td><td>Type A. MIL Illumination.</td></tr>
</table>

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PTS_MISSING_CALIBRATION_ERROR	C05D4	This monitor checks if: • Missing Calibration • NVRAM error • ECU/ACU mismatch	The PTS calibrations are stored in NVRAM and reused at the start of each drive cycle. This fault sets if the stored calibrations don't match the values reported by the PTS sensor.	None	After system start up and read from NVRAM	30 msec	Type A. MIL Illumination.
PTS1_OFFSET_ERROR	C05CC	This monitor checks if: • defective sensor • mechanical mounting of the sensor	The offset required to zero the PTS sensor is larger than the specification limit.	|PTS1 Offset) > 2.5 mm	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100ms Goal: 18000	Type A. MIL Illumination.
PTS2OFFSETERROR	C05CF	This monitor checks if: • defective sensor • mechanical mounting of the sensor	The offset required to zero the PTS sensor is larger than the specification limit.	|PTS2 Offset| > 2.5 mm	The fault itself does not have much enable condition. Whenever an offset is learned, it is checked for result. To allow the learning, vehicle faster than some speed, vehicle accelerating, driver not on brake.	100ms Goal: 18000	Type A. MIL Illumination.
MPS2_CORRELATION_ERROR	C058E	This monitor checks if: • MPS2 Failure • Note: MPS1 failure results in BOOSTED_BRAKE_SYSTEM_FAILURE for lack of motor rotation / pressure build	MPS1 is SPI based with a 50 usee update rate. MPS2 is SENT based with a 1 msec update rate. During motor rotation there is an expected difference in MPS1 and MPS2 based on the different time sampling rates (time lag on MPS2). MPS 1 and 2 moving different direction; or MPS 1 and 2 stopped at different relative postion than history	|MPS1 - MPS2| > 2 Degrees + 3 Degrees (motor speed offset) MPS 1 and 2 moving different direction; or MPS 1 and 2 stopped at different relative postion than history	Signal is valid	100 ms Goal: 18000	Type A. MIL Illumination.
MPS2_SENT_RECEIVE_ERROR	C2A1A	This monitor checks if: MPS2 Signal Failure	Monitor MPS2 sent data received from the SentSensor.	This failsafe detects when MPS2 sent data received from the SentSensor is out of the valid range.	MPS signal data is received.	5 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MPS_BIST_FAULT	C058A	This monitor checks if: MPS Built-in-Self-Test failure	Testing of this module should include running BIST at various MPS angles. The ECU performs an independent calculation parallel to internal MPU sensor BIST software. The fault will occur when the parallel calculations don't match.	The value calculated within the MPS does not equal the ECU calculated value.	BIST Inputs are not faulty.	30 msec	Type A. MIL Illumination.
MPS1_NOT_ALIVE_FAILURE	C058A	This monitor checks if: MPS1 Signal Failure	Any Condition	MPS == MPS_prev	MPS1 does not change for 5 consecutive readings.	100ms	Type A. MIL Illumination.
SYS_ASIC_VDBAT_RANGE_FAILURE	U3006	This monitor checks if: • VDBAT Voltage is outside the voltage range	• KL30_1 Supply voltage outside of the specified range • If the ASIC A/D value for VDBat is outside the acceptable range (VDBat < 6V or VDBat >25V) continuously for 100ms then the fault is set.	6V < KL30_1 Supply Voltage > 25V	• ASIC's VDBAT Voltage Result SPI field is outside the range of 6 and 25 volts for 100msec	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYS_ASIC_PDBAT_RANGE_FAILURE	U3007	This monitor checks if: • PDBAT Voltage is outside the voltage range	• KL30_2 Supply voltage outside of the specified range • If the ASIC A/D value for PDBat is outside the acceptable range (PDBat < 6V or PDBat >23V) continuously for 100ms then the fault is set.	6V < KL30_2 Supply Voltage > 23V	• ASIC's PDBAT Voltage Result SPI field is outside the range of 6 and 23 volts for 100msec	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "
KL30_1_OPEN_OR_SHRTED_TO_GND	U3006	This monitor checks if: • Fuse blown (Open) • Short_to_Ground	A feedback ratio is calculated based on the KL30_1_Fdbk_A and KL30_2_Fdbk_B. • If the feedback ratio is lower than the valid lower threshold ratio, then KL30_1_Open_or_Shrted_to_Gnd fault is set	• Ratio = (KL30_1-KL30_2)/(KL30_1+KL30_2) • If PSSW1 AND PSSW2 are turned OFF OR at least one safety switch is turned ON • Fault is set if ratio is less than -30% • If PSSW1 AND/OR PSSW2 are turned ON and all safety switches are turned OFF, • Fault is set if ratio is less than -10%	• Power ON, Continuous Failsafing	75ms	*Type C*, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
KL30_2_OPEN_OR_SHRTED_TO_GND	U3007	This monitor checks if: • Fuse blown (Open) • Short_to_Ground	A feedback ratio is calculated based on the KL30_1_Fdbk_A and KL30_2_Fdbk_B. • If this feedback ratio exceeds the valid upper threshold ratio, then KL30_2_Open_or_Shrted_to_Gnd fault is set. Note: Although the SW to tries to detect Fuse Blown/Shorted to ground with both switches on, fuse blown fault will not be detected due to the nature of the circuit and shorted to ground also may not be detected due to the damage that may be caused by this condition. Do not test this condition.	• Ratio = (KL30_1-KL30_2)/(KL30_1+KL30_2) • If PSSW1 AND PSSW2 are turned OFF OR at least one safety switch is turned ON, • Fault is set if ratio is greater than 30% • If PSSW1 AND/OR PSSW2 are turned ON and all safety switches are turned OFF, • Fault is set if ratio is greater than 10%	• Power ON, Continuous Failsafing	75ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYSTEM_VOLTAGE_LOW	P0562	This monitor checks if: • Vehicle Battery Voltage Supply is providing low voltage levels. • Defective cables. • Defective printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously lower than 8.5V for more than 150 msec then the fault is set. When the system voltage is continuously greater than 9.0V for more than 100 msec then the fault is cleared.	Filtered system voltage < 8.5V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	150 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYSTEM_VOLTAGE_EXCESSIVE_LOW	P0562	This monitor checks if: • Vehicle Battery Voltage Supply is providing excessively low voltage level. • Defective cable. • Defected printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously lower than 7.0V for more than 150 msec then the fault is set. When the system voltage is continuously greater than 7.5V for more than 150 msec then the fault is allowed to be cleared if not ignition latched.	Filtered system voltage < 7.5V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	150 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYSTEM_VOLTAGE_HIGH	P0563	This monitor checks if: • Voltage Supply is providing high voltage levels. • Defective printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously greater than 16.8V for more than 100 msec then the fault is set. When the system voltage is continuously less than 16.3V for more than 100 msec then the fault is cleared.	Filtered system voltage > 16.8 V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	100 ms	Type B. MIL Illumination.
SYSTEM_VOLTAGE_EXCESSIVE_HIGH	P0563	This monitor checks if: • Voltage Supply is providing excessively high voltage levels. • Defective printed circuit board.	System voltage is monitored continuously but the fault is not enabled during Engine crank. When the system voltage is continuously greater than 18.8V for more than 15 msec then the fault is set. When the system voltage is continuously less than 18.3V for more than 100 msec then the fault is cleared.	Filtered system voltage > 18.8V	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	15 ms	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYSTEM_VOLTAGE_ECU_SELF_TEST_HOLD	P0562	This monitor checks if: • Voltage Supply is providing excessively low or high voltage levels. • Defective printed circuit board.	System Self Test will not start if either of the following conditions are present: Polaris is not initialized Unfiltered System Voltage is outside the Excessive range (< 7.0V or >18.8V) If the System Self Test is delayed continuously for more than 100 msec then the fault is set.	Polaris.Resync_Seq_Error = TRUE or Unfiltered system voltage < 7.0V or Unfiltered system voltage > 18.8V	• Polaris is not initialized yet • System Voltage is outside the Excessive range (<7.0 V or >18.8V) Have not finished self-test	5 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
SYSTEM_VOLTAGE_ERRATIC	P0562	This monitor checks if: • Voltage Supply is toggling between non-operational voltages and/or normal operating voltages • Defective cables. • Defective printed circuit board.	If the filtered System Voltage is above Excessive High Voltage threshold or below Low Voltage threshold, this fault counts toward failure and if the voltage is above Low Voltage and below Excessive High Voltage thresholds the fault counts toward passing. This fault is done this way to catch voltages jumping between non-operational voltages and/or normal operating voltages.	If (Filtered System Voltage > 18.8) || (Filtered System Voltage < 8.5) fail_counter += 15 else fail_counter -= 5 If fail_counter >= 900 set fault	• Engine is not being cranked • System is not re-initializing or shutting down • System is not shutting down	300ms minimum	Type C, No MIL, "Emissions Neutral Diagnostic "
PRIMARY_WAKEUP_LINE_STUCK_LOW	P2534	This monitor checks if: HW ignition line failure	The MCU compares the state of the Primary Wakeup Line with the Ignition switch status CAN signal from the ECM. If the Primary Wakeup Line is read as Low but Ignition switch status signal indicates RUN or CRANK for a continuous 3 sec then the fault is set. This fault is not enabled if the Missing PPEI Engine General Status 1 CAN message fault is set.	(State of Primary Wakeup line == Not Wake) && (CAN Signal == (CRANK || RUN))	• Primary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_PPEI_ENGINE_GENERAL_STATUS_1 fault is not latched)	2s	Type B. MIL Illumination.
PRIMARY_WAKEUP_LINE_STUCK_HIGH	P2535	This monitor checks if: HW ignition line failure	The MCU compares the state of the Primary Wakeup Line with theIgnition switch status signal from the ECM. If the Primary Wakeup Line is read as High but Ignition switch status signal indicates not Crank and not RUN for a continuous 3 sec then the fault is set This fault is not enabled if the Missing PPEI Engine General Status 1 CAN message fault is set.	(State of Primary Wakeup line == Wake) && (CAN Signal != (CRANK || RUN))	• Primary Wakeup COMMS Signal is Valid (Singal is Valid when MISSING_PPEI_ENGINE_GENERAL_STATUS_1 fault is not latched) •AND • Primary Wakeup Line is ON	2s	Type B. MIL Illumination.
INTERNAL_5V_SUPPLY_VOLT_ERRATIC	P0606	This monitor checks if: • Defective internal 5 V supply circuit • Defective printed circuit board • Defective microprocessor feedback input port • Defective Polaris ASIC feedback input port	If the filtered 5V supply toggles outside the allowed range but does not stay there long enough to mature the INTERNAL_5V_SUPPLY_VOLT_FAILURE then this fault is matured by an up/down counter on the condition	If the filtered System Voltage toggles as per the below range Filtered system voltage ? 4.75V Filtered system voltage ? 5.25 V	• Internal 5V supply is enabled •AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	800 counts/80ms minimum	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ECU_SELF_TEST_T|MEOUT	P0562	This monitor checks if: Faulted ECU	If the ECU self test does not complete in the alloted amount of time, then set this fault. This fault allows to properly inform the driver that the EBCM functionality is not available. Note- Timeout fault is latched if system self-test doesn't finish within 2 seconds. This time doesn't include the on-hold time if the battery voltage is out of range.	None	Runs duting startup	5 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PWR_PTS_MPS_SUP1_RANGE_LOW	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously < 4.85V for 100ms then the respective supply fault is set.	if PWR<4.85for 100ms	• MPS1 sensor is enabled • PTS1 sensor is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP1_RANGE_HIGH	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously > 5.15V for 100ms then the respective supply fault is set.	if PWR>5.15V for 100ms	• MPS1 is enabled • PTS1 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP1_ERRATIC	C05D1	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If a supply feedback is outside the acceptable range (< 4.85V or > 5.15V) then the respective erratic fault is matured at a weight of 50 toward a goal of 800 (fastest maturation = 80 msec). If the feedback voltage returns within the 4.85 - 5.15V range then the erratic fault is dematured at a weight of 1. Once the fault goal is reached then the fault is set and is ignition latched.	if PWR<4.85 or >5.1 5V	• MPS1 is enabled • PTS1 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	80ms minimum	Type A. MIL Illumination.
PWR_PTS_MPS_SUP2_RANGE_LOW	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously < 4.85V for 100ms then the respective supply fault is set.	if PWR<4.85for 100ms	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PWR_PTS_MPS_SUP2_RANGE_HIGH	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If either supply is continuously > 5.15V for 100ms then the respective supply fault is set.	if PWR>5.15Vfor 100ms	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	100ms	Type A. MIL Illumination.
PWR_PTS_MPS_SUP2_ERRATIC	C05BB	This monitor checks if: • Defective motor position sensor • Defective pedal travel sensor • Defective printed circuit board	The MCU provides two 5V sensor supplies for the Pedal Travel and Motor Position Sensors (each supply powers one circuit of the PTS and one circuit of the MPS). The MCU monitors the feedbacks on these two voltage supplies. If a supply feedback is outside the acceptable range (< 4.85V or > 5.15V) then the respective erratic fault is matured at a weight of 50 toward a goal of 800 (fastest maturation = 80 msec). If the feedback voltage returns within the 4.85 - 5.15V range then the erratic fault is dematured at a weight of 1. Once the fault goal is reached then the fault is set and is ignition latched.	if PWR<4.85 or>5.15V	• MPS2 is enabled • PTS2 is enabled AND • None of the following are taking place: • System is initializing • System is re-initializing • Engine is being cranked • When requested by Diagnostic commands System is shutting down	80ms minimum	Type A. MIL Illumination.
PWR_SW_COIL_SUP_OPEN	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the ABS Coil Safety Relay. If the feedback voltage is less than 80% of KL30JNT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_COIL_SUP_SHORT	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30 INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is off the downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the ABS Coil Safety Relay. If the feedback voltage is not less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_BB_COIL_SUP_OPEN	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the BB Coil Safety Relay. If the feedback voltage is less than 80% of KL30JNT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PWR_SW_BB_COIL_SUP_SHORT	C053B	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30_INT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is off the downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the BB Coil Safety Relay. If the feedback voltage is not less than 80% of KL30_INT for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_MOT_SUP_OPEN	C0595	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is on the downstream voltage feedback is expected to be high. The MCU monitors the voltage feedback downstream from the Motor Safety Relay. If the feedback voltage is less than 80% of KL30JNT for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWRSWMOTSUPSHORT	C0595	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30 supply inputs are switched on/off by the two Power Switches. The downstream KL30JNT supplies the ABS Coils, the BB Coils and the Motor Driver. These three circuits are individually switched on/off by separate Safety Relays. When the Safety Relay is off the downstream voltage feedback is expected to be low. The MCU monitors the voltage feedback downstream from the Motor Safety Relay. If the feedback voltage is not less than 80% of KL30JNT for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
PWR_SW_PSSW1_SUP_OPEN	U3006	This monitor checks if: • Disconnected Switch • PCB Problem	This fault is not enabled is a Watchdog fault is already set. The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When either Switch is turned on then it's respective Power Switch Feedback is expected to be high. If the feedback voltage is less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PWR_SW_PSSW1_SUP_SHORT	P0606	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When both Switches are turned off then both Power Switch Feedbacks are expected to be low. If the feedback voltage is not less than 80% of it's respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PWR_SW_PSSW2_SUP_OPEN	U3007	This monitor checks if: • Disconnected Switch • PCB Problem	This fault is not enabled is a Watchdog fault is already set. The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When either Switch is turned on then it's respective Power Switch Feedback is expected to be high. If the feedback voltage is less than 80% of its respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage < 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PWR_SW_PSSW2_SUP_SHORT	P0606	This monitor checks if: • Disconnected Switch • PCB Problem	The KL30_1 and KL30_2 voltage supply inputs are individually switched on/off by separate Power Switch circuits. When both Switches are turned off then both Power Switch Feedbacks are expected to be low. If the feedback voltage is not less than 80% of its respective KL30_x supply voltage for a continuous 50 msec then the fault is set.	If Feedback Voltage > 80%of KL30_x	• Power ON, Continuous Failsafing	50ms	Type A. MIL Illumination.
SYS_ASIC_VCP12_U12_VOLTAGE_LOW	P0606	This monitor checks if: Defective vehicle battery or Charging system Otherwise: -Defective system ASIC -Defective printed circuit board. • Defective system ASIC	The Polaris ASIC provides an internal VCP12 voltage regulator which is required to operate the I_SSR amplifier and to maintain regulation of the VA5pOregulators and the U3 and U1 linear regulators. If the VCP12 voltage is less that 7.25 V for 44 ?sec then the Polaris sets the VPC12 Low Voltage Warning SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set.	VCP12 voltage is less that 7.25 V for 44 ?sec	• Polaris is initialized	100 msec	Type A. MIL Illumination.
SYS_ASIC_CHARGE_PUMP_OVER_VOLT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides a two-stage charge pump to produce a voltage greater than the VCP12 voltage. If the charge pump voltage exceeds VCP12 voltage by more than 13V for 53 msec then the Polaris sets the Charge Pump Overvoltage Limit SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set.	charge pump voltage exceeds VCP12 voltage by more than 13V for 53 msec	• Polaris is initialized	100 msec (145.2 ms)	Type A. MIL Illumination.
SYS_ASIC_VDG_RANGE_FAULT	P0606	This monitor checks if: • Defective system ASIC	Verify that the KL30_1 Power Switch command is not stuck On. The ASIC VDG pin controls the KL30_1 Power Switch. While the Power Switch is commanded off, the SW reads the ASIC's VDG voltage feedback. When the VDG voltage is continuously >= 1.0V for more than 100 msec then the fault is set.	SSRON: VDBat+3V <= VDG <= VDBat+12V SSROFF: VDG <= 1.0V	• Polaris is initialized	100 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SYS_ASIC_VBAT_SW_OVERCURRENT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides an overcurrent protected VBAT_SW output used for powering sensors and external circuits. If the VBAT_SW current draw exceeds 150 mA for 800 ?sec then the Polaris sets the VBAT_SW Overcurrent SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 25 msec then the fault is set.	VBAT_SW Enable and VBAT_SW Over-Current SPI bits are both TRUE	• Polaris is initialized	25 msec	Type A. MIL Illumination.
SYS_ASIC_VBAT_SW_CORR	P0606	This monitor checks if: • Defective system ASIC	The MCU shall read the ASIC's VBAT_SW Voltage Result SPI field and perform a plausibility check against the measured U12 voltage from the Polaris. When the difference between the two voltage values is continuously > 1.75V for more than 25 msec then the fault is set.	voltage difference > 1.75 volts	• Polaris is initialized • when the VBAT switch is commanded On	15 msec	Type A. MIL Illumination.
SYS_ASIC_VBAT_SW_DISABLE_CORR	P0606	This monitor checks if: • Defective wiring harness • Defective ASCI • Defective CPU • Defective circuit board	Check that the ASIC VBAT_SW output is not leaking or stuck On. The MCU shall read the ASIC's VBAT_SW Voltage Result SPI field when the commanded VBAT_SW state is Off. If the voltage is continuously > 1.5V for more than 25 msec then the fault is set.	voltage difference > 1.5 volts	-Polaris is initialized -Power Switch is OFF	25 msec	Type A. MIL Illumination.
SYS_ASIC_U5_FAILURE	P0606	This monitor checks if: • Defective system ASIC	The U5 power supply regulates battery voltage down to 5V to supply such circuits as network communication transceivers, internal sensors and ADC references. If U5 is outside the acceptable range (<4.75V or >5.1 V) continuously for 105 ?sec then the ASIC shall continue to attempt to regulate U5 and set the U5 Out of Range Warning SPI bit to True. Software monitors this SPI bit. If it becomes True then the fault is set immediately.	The MCU shall monitor the ASIC's U5 Out of Range Warning SPI bit. (<4,75V or >5.1V)	• Polaris is initialized	5 msec	Type A. MIL Illumination.
SYS_ASIC_CHARGE_PUMP_UNDER_VOLT	P0606	This monitor checks if: • Defective system ASIC	The Polaris ASIC provides a two-stage charge pump to produce a voltage greater than the VCP12 voltage. If the charge pump voltage exceeds VCP12 voltage by less than 9.5V for 5.5 msec then the Polaris sets the Charge Pump Undervoltage Limit SPI bit to True. Software monitors this SPI bit. If it is continuously True for more than 100 msec then the fault is set.	If the charge pump voltage exceeds VCP12 voltage by less than 9.5V for 5.5 msec	• Polaris is initialized	100 msec (105.5 ms)	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
U5_ASIC_ADC_REF_FAULT	P0606	This monitor checks if: • Defective system ASIC or circuit board	The 5V regulated supply is read at the ASIC. If it is not within the range, then the fault is set.	Asic U5 is not within the 4.75V and 5.25V	Polaris is initialized	80 msec	Type A. MIL Illumination.
SYS_ASIC_U3_UV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	• When the U5, U3, or U1 Undervoltage Diagnostic SPI bit is set, the ASIC shall raise the effective U5 out of range lower warning level, or the U3 or U1 undervoltage fault threshold above the maximum U5, U3, or U1 regulation voltage, thus forcing a U5 out of range warning or U3 or U1 undervoltage fault. • Periodically, the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 undervoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_U3_OV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	• When the U5, U3, U1 Overvoltage Diagnostic SPI bit is set, the ASIC shall lower the effective overvoltage fault threshold below the minimum U5, U3, or U1 regulation voltage, thus forcing a U5, U3, or U1 overvoltage fault. • Periodically (e.g. once per ignition cycle at shutdown), the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 overvoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
SYS_ASIC_U5_OV_RESET_FAULT	P0606	This monitor checks if: • ASIC power supply block problem • Defective ASIC • PCB problem	• When the U5, U3, U1 Overvoltage Diagnostic SPI bit is set, the ASIC shall lower the effective overvoltage fault threshold below the minimum U5, U3, or U1 regulation voltage, thus forcing a U5, U3, or U1 overvoltage fault. • Periodically (e.g. once per ignition cycle at shutdown), the MCU shall store a flag in NVM indicating that it will perform a U5, U3 or U1 overvoltage diagnostic. The MCU shall then force one of the three test modes and start a timer.	The MCU shall detect a fault if it does not receive a reset within the expected time. If a reset occurs, the MCU shall check NVM and the ASIC's Reset Source SPI Register, and verify that the reset was due to a planned test.	• Runs during initialization	10 msec	Type A. MIL Illumination.
BOOSTED_BRAKE_SYSTEM_FAILED	C0021	This monitor checks if: Internal eBoost failure	Error Threshold (Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value). XO: 0 BAR , YO: 0 BAR X1 : 6 BAR , Y1 : 3 BAR X2 : 20 BAR , Y2 : 4 BAR X3 : 200 BAR , YO: 40 BAR When ABS is active the Y values are increased by 30% When the boost error exceeds this threshold the "error" signal is integrated each loop and when it exceeds 2000 Bar-msec the fault will set.	Derivative of the Boost pressure target > (-150 Bar/s) AND Derivative of Boost pressure < 200 Bar/s	The Measured Boost Pressure is compared against an "error" threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle. The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar). This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced. When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error. When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode.	5 ms	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BOOSTED_BRAKE_SYSTEM_FAILED_CRANK	P0562	This monitor checks if: Internal eBoost failure	Error Threshold (Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value). XO: 0 BAR , YO: 0 BAR X1 : 6 BAR , Y1 : 3 BAR X2 : 20 BAR , Y2 : 4 BAR X3 : 200 BAR , YO: 40 BAR When ABS is active the Y values are increased by 30% When the boost error exceeds this threshold the "error" signal is integrated each loop and when it exceeds 2000 Bar-msec the fault will set.	Derivative of the Boost pressure target > (-150 Bar/s) AND Derivative of Boost pressure < 200 Bar/s and CRANKING is present	The Measured Boost Pressure is compared against an "error" threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle. The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar). This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced. When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error. When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode.	5 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK	C05B0	This monitor checks if: Monitors for leaks in the braking system at the circuit level during braking events. This is different from the Static Leak check which looks for leaks at the channel level at shutdown.	The leak detection logic compares pressure gradient threshold against the measured pressure gradient. Once the error last longer than a time threshold, and the pressure error integral passes its threshold, leak is detected. The pressure gradient can be estimated from Dap flow rate and PV information; Similarly, pressure can be estimated from Dap volume and PV information. Here the worst case PV is taken	There are 12 calibrations associated with this failsafe so it is impossible to describe the interation of all of them in this document. Ulitimately when the pressure error integral exceeds 20 bar AND the pressure gradient error integral exceeds 3000 Bar/s the fault is set.	Boost control active Boost pressure > 2 Bar Advancing DAP (no replenishment mode) No slip control active Faded brakes have not been detected	5 msec	Type A. MIL Illumination.
BOOSTED_BRAKE_SYSTEM_LEAK_ISO_FAILED	C05B0	This monitor checks if: Set if the leakage circuit cannot be isolated successfully	Brake fluid leak on a channel or circuit without the ability to identify the location of the leak	BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK AND Circuit cannot be isolated	BOOSTED_BRAKE_SYSTEM_DYNAMIC_LEAK already present.	230 msec	Type A. MIL Illumination.
BOOST_POWER_MANAGEMENT_ENABLED_WARNING	P0562	This monitor checks if: Low input voltage to the module	This fault sets due low voltage in order to disable features before affect boosted brakes operation.	Motor Voltage < 9.3 V	Propulsion System Active = TRUE or (System Power Mode = Run and vehicle speed > then 3 kph)	5 occurrences of dipping below 9.3 V within 2 minutes without stable voltage above 11.3V	Type C, No MIL, "Emissions Neutral Diagnostic "
BOOST_POWER_MANAGEMENT_ACTIVE_FAILURE	P0562	This monitor checks if: Low input voltage to the module	Did not detect BOOST_POWER_MANAGEMENT_ENABLED_WARNING Motor Voltage < 7 V (Need for quickly detecting to protect the DAP if for some reason the BOOST_POWER_MANAGEMENT_ENABLED_WARNING is not detected.)	Motor Voltage < 7V	Propulsion System Active = TRUE or (System Power Mode = Run and vehicle speed > 3 kph)	17.5 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BOOSTED_BRAKE_SYSTEM_FAILED_WARNING	C0021	This monitor checks if: Internal eBoost failure	Error Threshold (Y value) is a linear lookup table value which is a function of the Boost Pressure Target (X value). XO: 0 BAR , YO: 0 BAR X1 : 6 BAR , Y1 : 3 BAR X2 : 20 BAR , Y2 : 11 BAR X3 : 200 BAR , YO: 155 BAR	Derivative of the Boost pressure target > (-150 Bar/s) AND Derivative of Boost pressure < 200 Bar/s	The Measured Boost Pressure is compared against an "error" threshold and sets a fault when the difference is large enough to cause possible under braking of the vehicle. The difference or "error" threshold itself is a function of the Boost Pressure Target such that larger errors are accepted as the requested pressure increases (i.e. a request of 30 bar that results in a 10 bar pressure is considered more consequential than a 20 bar error at a pressure request of 180 bar). This error threshold gets desensitized when slip control is active to account for the more dynamic boost pressure response when individual wheel control is active. Right now this is a percentage of the base error threshold, but will need to be enhanced. When the measured pressure is less than the error target the fault maturity counter accumulates at a rate proportional to the error. When the counter reaches a maturation threshold the fault will get set and the system will enter Push Through mode.	750 ms max (fault matures rate depends on the gradient of the boost error)	Type B. MIL Illumination.
PTU_ESTABLISH_HOME_POSITION	C0021	This monitor checks if: Set if motor could not find home position during startup	Motor could not find home position in 4sec. Motor gets stuck somewhere	Motor still moving to find home position for 4 sec	Cycle IGN or Clear Code	1 msec	Type B. MIL Illumination.
ACUNOTCONFIGURED	P0602	This monitor checks if: Set if EOL sensor Learn or Comp Port Learn has not done or failed	Read DID 46, if DID 46 == OF00, clear the fault, otherwise, set the fault	Read DID 46, if DID 46 == OF00, clear the fault, otherwise, set the fault	Learn all EOL sensor, and comp port learn again and clear code	5 msec	Type A. MIL Illumination.
BRAKE_BY_WIRE_HIGH_LEVEL_MONITOR_FAILURE	C0021	This monitor checks if: Base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled.	The goal of this fault monitor is to look for conditions where the base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. The validity of the driver inputs, base brake mode, Actuator control mode, Boost/Brake Arbitrator states, and the Electric drive states must all agree that boosted brakes are allowed for the base brake valves to be in a boosted condition. Otherwise the fault will be matured.	• (Pedal Travel signal is not valid AND SCP is invalid) OR • Boost Arb targeted pressure is not available OR • BOOST System in INHIBITED OR • Electric Drive state is not active or not running OR • Actuator Control is not allowed	• Pedal travel sensor signal • SCP value • Boost Arb state • Electric drive status	200 msec	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BRAKE_BY_WIRE_HIGH_LEVEL_MONITOR_FAILURE_CRANK	P0562	This monitor checks if: Base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled.	The goal of this fault monitor is to look for conditions where the base brake values are energized in a boosted brake mode, while there are any parts of the boost logic which indicate that boosted brakes should not be enabled. The validity of the driver inputs, base brake mode, Actuator control mode, Boost/Brake Arbitrator states, and the Electric drive states must all agree that boosted brakes are allowed for the base brake valves to be in a boosted condition during CRANKING. Otherwise the fault will be matured.	• (Pedal Travel signal is not valid AND SCP is invalid) OR • Boost Arb targeted pressure is not available OR • BOOST System in INHIBITED OR • Electric Drive state is not active or not running OR • Actuator Control is not allowed OR	• Pedal travel sensor signal • SCP value • Boost Arb state • Electric drive status	200 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
STATIC_CIRCUITO_LEAK_DETECTED	C05B0	This monitor checks if: System Leak	Leak fault, commands each circuit to build 30 bar pressure and checks for a leak by holding for 1sec. If the pressure drops to 24 bar, this fault is set.	Checks every wheel if there is a leak during shutdown.	Runs During Shutdown	5 msec	Type A. MIL Illumination.
STATIC_CIRCUIT1_LEAK_DETECTED	C05B0	This monitor checks if: System Leak	Leak fault, commands each circuit to build 30 bar pressure and checks for a leak by holding for 1sec. If the pressure drops to 24 bar, this fault is set.	Checks every wheel if there is a leak during shutdown.	Runs During Shutdown	5 msec	Type A. MIL Illumination.
BRAKE_BLEED_NOT_COMPLETED	C15C7	This monitor checks if: DID NOT write DID B2	DIDB2 ==0	DID B2 == 0	Runs Continuous	5 msec	Type A. MIL Illumination.
BOOST_STARTUP_FAILURE	P0562	This monitor checks if:	After mode manger completes system self test the boost system looks to intialize the boost controller. If during this phase the conditions are not correct we will set a fault.	When boost control state is in initialze state a timer is incremented allowing a set time to initialize before a fault should be set.	Run during the power up initializtion of boost arbitration	4 seconds	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
EPB_SWT_NODE_FAILURE	U1122	This monitor checks if: LIN cable not connected to switch (Wiring), EPB fuse, EPB faulted	This fault will be set when the connection to the EPB LIN Switch is disconnected. Increment a counter if the LIN cable is not connected to the switch, this fault will be set if no connection is detected.	No connection detected (Lost Communication)	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • System Power Mode is in crank mode. • EPB channel failure is not set. • PB_WAKE_UP_LINE_VOLTAGE_FAULT is not set.	Goal = 3	Type C, No MIL, "Emissions Neutral Diagnostic "
EBCM_EPB_SWITCH_RSP_MSG_FAULT	U1122	This monitor checks if: Incoming message is not as expected	The incoming message on LIN is invalid then set this fault	Invalid message	• Fault will not be set during the following conditions: • within the first 2 seconds after System Power Mode has transitioned to RUN or OFF • Supply Voltage is less than 9V • System Power Mode is in crank mode. • EPB channel, node failure is not set. • PB_WAKE_UP_LINE_VOLTAGE_FAULT is not set.	Time = 15 msec Goal = 3	Type C, No MIL, "Emissions Neutral Diagnostic "
CAN_OBUS_OFF_COMMS_FAULT	U0075	This monitor checks if: • HS bus Shorted • CAN transceiver faulty	Can peripheral locks for the bit errors in transmitted messages and increments txerror counter if any error is detected	if txerror counter reaches 256 and doesn't transmit any message for the fault maturation time.	• When wake lines are enabled. • Node supervisor is in enabled state	220 msec	Type B. MIL Illumination.
CAN_1_BUS_OFF_COMMS_FAULT	U0073	This monitor checks if: • CE bus Shorted • CAN transceiver faulty	CAN peripheral locks for the bit errors in transmitted messages and increments Tx error counter if any error is detected. if Tx error counter reaches 256 the fault get set.	if txerror counter reaches 256 and doesn't transmit any message for the fault maturation time.	• When wake lines are enabled. • Node supervisor is in enabled state	220 msec	Type B. MIL Illumination.
PB_WAKE_UP_LINE_VOLTAGE_FAULT	C0616	This monitor checks if: • Transceiver faulty • PCB probelm	The Sw monitors the A2D feedback received from INH pin of LIN transceiver if this voltage drops below the threshold voltage for 60msec we set this fault indicating EPB wake up is not possible .	If the transceiver feedback drops below voltage 6v	• Power ON, Continuous Failsafing	30 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
KEY_TABLE_NOT_PROVISIONED	U1960	This monitor checks if: • Security peripheral general key is NOT provisional.	1) The Authoritative Counter reaches its maximum value. 2) Any single Key Slot Provision State Flag for Key 2 through Key <n> is equal to a value of 0 while the MEC is equal to 0. 3) Upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP). All messages authenticated using the missing key will be invalidated. Invalidated messages are discarded without any further processing.	1) The Authoritative Counter reaches its maximum value. 2) Any single Key Slot Provision State Flag for Key 2 through Key <n> is equal to a value of 0 while the MEC is equal to 0. 3) Upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP).	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V < VB < 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition • Vehicle is in logistic mode.	1 count	Type A. MIL Illumination.
SECURITY_PERIPHERAL_PERFORMANCE	U1961	This monitor checks if: • Security Peripheral Performance - Performance or Incorrect Operation • Unable to generate a MAC • Unable to verify a MAC	1) If a request to the security peripheral to generate a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error. 2) If a request to the security peripheral to verify a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error. • The actual amount of time varies based upon security peripheral hardware used but will be less than a few seconds. • In the event the security peripheral cannot generate a MAC due to an internal error, the authenticated message shall be broadcast with a MAC equal to zero. • Failed verification means the message is discarded, no failsoft action is taken other than to set the DTC.	1) If a request to the security peripheral to generate a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error. 2) If a request to the security peripheral to verify a Message Authentication Code (MAC) does not result in a response within a set amount of time*, the security peripheral is considered to have failed due to an internal error. * The actual amount of time varies based upon security peripheral hardware used but will be less than a few seconds.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V < VB < 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition • Vehicle is in logistic mode.	1 count	Type A. MIL Illumination.
ECMAVHSTATUSFAULT	C15C6	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	When the incoming message is unpacked, the validity bit will be checked immediately.	AVHSwtchStats = 0	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Supply Voltage is not in the range 9V <= V <= 16V • Within the first 5 seconds of recovery from an under or over voltage condition CAN Bus Off Failure is latched	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_BODY_GEN_INFO_3	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
ESP_ENG_SPD_STAT_ABOVE_RANGE	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• COMMS Message must be received. When correct message is received by EBCM, it is unpacked and pertinent signals are checked for a range error.	EngSpdStat_0 == 0x02	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 Count	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_ACT_AXL_TORQUE	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
ACT_AXL_TORQUE_SECURITY	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
ACTAXLTORQUEARC	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_MSG_STRG_WHL_INFO	U0131	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 100 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V <= VB >= 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "
STRG_WHLJ NFO_ARC	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
SWIP_STRG_WHL_ANG_DUD	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module • Data mask is stuck off • Incorrect SAS installed	• When the incoming message is unpacked, the data mask bit will be checked immediately.	SAS Data Mask Failure indicated if data mask in message 0x1E5 is stuck off (equal to zero) for an extended period	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise	Type C, No MIL, "Emissions Neutral Diagnostic "
SWIP_STRG_WHL_ANG_CALIB_STS_FAULT	C0051	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the calibration bit will be checked immediately.	StrWhlAngSenCalStat == 0x0	• Fault will not be set during the following conditions: • within the first 5 seconds after System Power Mode has transitioned to RUN • Supply Voltage is not in the range 9V <= V <= 16V • Within the first 5 seconds of recovery from an under or over voltage condition • CAN Bus Off Failure is latched	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSINGGWCGM06MSG	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_GWCGM_34_MSG	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_PSTN_OFST_FRM_TRM_3	U0132	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PSTN_OFST_FRM_TRM_3_CHCKSUM	U0421	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + CHKSUM != 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
PSTN OFST_FRM_TRM_3_ARC	U0421	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_VEH_LVL_CTL_GENJNFO_1	U0132	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
VEH LVL CTL GEN INFO_1_ARC	U0421	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
VEH_LVL_CTL_G ENJ NFO_1_PROT_FAULT	U0421	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	The EBCM is monitoring all relevant signals of the messages that are received and unpacked. Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + Protection_Value != 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_ELEC_PWR_STRG_OVRLY	U0131	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
COMMS_TORQUE_OVERLAY_DELIVERED_STATUS_FAULT	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	The Brake Control System shall set a code, if Torque Overlay Torque Delivered Status remains $0, Inactive for 250 ms after the brake control system made a steering torque request.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	250 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_DAMPER_CTRL_INFO	U0139	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
DAMPER_CTRL_INFO_ARC	U043A	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
DAMPER_CTRL_INFO_PROT_FAULT	U043A	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	The EBCM is monitoring all relevant signals of the messages that are received and unpacked. Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + Protection_Value != 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_AUTO_CLT_GEN_INFO	U1614	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_ALC_VEH_TOP_SPD_LIM	U0132	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
ALCVEHTOPSPDLIMARC	U0421	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
ALC_VEH_TOP_SPD_LIM_PROT_FAULT	U0421	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	The EBCM is monitoring all relevant signals of the messages that are received and unpacked. Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + Protection_Value != 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_BKUP_SYS_PWR_MD	U1607	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
BKUP_SYS_PWR_MD_ARC	U0447	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_CGM_CAN1_MSG04	U1607	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_CGM_CAN1_MSG06	U1607	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_LAT_LONG_DATA	U0151	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 100 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "
LAT_LONG_DATA_SECURITY	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
LAT_LONG_DATA_ARC	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9V <= V <= 16V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
LLDP_VEH_ACCEL_DUD	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module • Data mask is stuck off • Incorrect IMU installed	• When the incoming message is unpacked, the data mask bit will be checked immediately.	IMU Data Mask Failure indicated if data mask in message 0x140 is stuck off (equal to zero) for an extended period	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise	Type C, No MIL, "Emissions Neutral Diagnostic "
LLDP_LAT_ACCEL_SNSR_CORR_STS_FAULT	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the correlation status bit will be checked immediately.	Correlation Status = Unknown	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
LLDP_LONG_ACCEL_SNSR_CORR_STS_FAULT	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the correlation status bit will be checked immediately.	Correlation Status = Unknown	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_OCCPT_RSTRNT_INFO	U0151	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_PST_CLSN_INFO	U0151	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
PSTCLSNINFOSECURITY	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
PSTCLSNJNFOARC	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
STRG_WHL_INFO_SECURITY	U0420	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_YAW_RATE	U0151	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 100 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
YAW_RATE_SECURITY	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_RATE_ARC	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
YAWRATEDUD	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the data mask bit will be checked immediately.	Data Mask Failure indicated if data mask in message is stuck off (equal to zero) for an extended period	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	5 seconds if vehicle has not yet reached 1.3 m/s, 50 msec otherwise	Type C, No MIL, "Emissions Neutral Diagnostic "
YAW_RATE_CORR_FAULT	U0452	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the correlation status bit will be checked immediately.	Correlation Status = Unknown	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_ACC_GNRL_INFO1_FCM	U0265	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_ACC_GNRL_INFO1_EOCM	U1615	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
ACCGNRLINFO1SECURITY	U053B	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
ACCGNRLJNFO1ARC	U053B	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_MSG_APA_STS	U160C	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
APASTSSECURITY	U045A	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
APA_STS_ARC	U045A	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_BCM_CAN2_MSG01	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSINGCGMCAN2MSG03	U1608	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_CGM_CAN2_MSG02	U1608	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_BCM_CAN2_MSG04	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_BCM_CAN2_MSG02	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_BODY_GEN_INFO_1	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_BODY_VEH_SPD_CTL_RESP	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_DRVR_INTD_AXL_TQ_MN	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_DRVR_INTD_AXL_TQ_MX	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_DRVR_INTD_TQ	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_ECM_CAN2_MSG01	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSINGECMCAN2MSG02	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_ECM_CAN2_MSG03	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
ECM_CAN2_MSG02_ARC	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ECM_CAN2_MSG02_PRTCTN_VAL	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	The EBCM is monitoring all relevant signals of the messages that are received and unpacked. Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	ARC + Protection_Value != 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSINGGWCGM92MSG	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSINGECMCAN2MSG04	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
CHS_SYS_TOTAL_AXLE_TRQ_REQ_STS_FAILED	C2A07	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the torque request status will be checked immediately.	Chassis System Total Axle Torque Request Status : Request Status = 2 OR 3 OR 4 OR 5 OR 6 Following are the ENUMs for Signal CSTATRS_ReqSts $0=No_Request $1=Request_Honored $2=Lost_Arbitration $3=Serial_Data_Failure_Temporary $4=Serial_Data_Failure_Permanent $5=Control_System_Failure_Temporary $6=Control_System_Failure_Permanent	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSINGECMCAN2MSG12	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_EOCM_EOCM_HCP1_CAN2_MSG01	U1615	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_FCM_CAN2_MSG01	U0265	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_EXT_LGT_WSH_WPR_INFO	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_ENG_SPD	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_EOCM_GNRL_INFO1	U1615	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
EOCM_GNRL_INFO1_SECURITY	U053B	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
EOCM_GNRL_INFO1_ARC	U053B	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_FRT_TIRE_PRS	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_GWCGM_25_MSG	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_GWCGM_36_MSG	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_GWCGM_90_MSG	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_LSCMB_AUTO_BRK	U0265	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
LSCMB_AUTO_BRK_SECURITY	U0566	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
LSCMB_AUTO_BRK_ARC	U0566	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSING_OTS_AIR_TMP	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_PRPL_STAT	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_SYS_PWR_MD	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
SYSPWRMDARC	U0422	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. •Any alive rolling count value that matches the previously received value will activate the fault counter. • Alive Rolling Count and Protection Value Errors will be detected according to GMW8772.	New_ARC - Prev_ARC == 0	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_TEEN_DRVR_ACTV	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_TRNS_EST_GR	U0101	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
TRNS_EST_GR_SECURITY	U0402	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
TRNS_EST_GR_ARC	U0402	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_ECM_TCM_CAN2_MSG01	U0101	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_ECM_TCM_CAN2_MSG02	U0101	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
TRNS_OIL_TMP_SIG_INVALID	U0402	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• When the incoming message is unpacked, the validity bit will be checked immediately.	Transmission Oil Temperature Invalid =1	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V < VB < 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition • Vehicle is in logistic mode.	1 count	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_MSG_VEH_MTN_INFO_1	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
VEH_MTN_INFO_1 SECURITY	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
VEH_MTN_INFO_1_ARC	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_VEH_ODO_DISP_VAL	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_MSG_WHL_DIST	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_BCM_GNRL_INFO1	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSING_ECM_GNRL_INFO1	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
ECM_GNRL_INFO1_ARC	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the ARC value with every new received frame. • GM's SUM indicates a failed continuous operation.	• GM's SUM indicates a failed continuous operation.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
ECM_GNRL_INFO1_SECURITY	U0401	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring all relevant signals of the messages that are received and unpacked. •The receiver shall check the Protection value with every new received frame. • GM's SUM indicates failed safety and failed security.	• GM's SUM indicates failed safety and failed security.	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	fastest maturation is 3 consecutive count sequence errors. Sliding Window Fail Threshold is 3 out 16	Type B. MIL Illumination.
MISSING_ECM_GNRL_INFO2	U1611	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MISSING_EOCM_EOCM_HCP1_FCM_MSG01	U1615	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type C, No MIL, "Emissions Neutral Diagnostic "
MISSINGGWCGM51MSG	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2.5 Counts	Type B. MIL Illumination.
MISSINGBCMCAN2MSG07	U0140	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2500 ms	Type B. MIL Illumination.
MISSING_NODESTATUS_CAN2_MSG01	U1607	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The EBCM is monitoring the CAN bus for this message and checks if the message was received in the detection time.	Message missing for 250 msec OR Message length is less than defined by DBC	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
NODE_STSJ PC_LCFA_FAULT	U0447	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	Node Status TCCM3 Loss of Communication Fault Active	Node Status TCCM3 Loss of Communication Fault Active	Fault is not set when: • While System Power Mode equals Start • Within the first 5 seconds after the Vehicle Power Mode has transitioned to Off, Run, or Propulsion • Supply voltage is not within the range: 9.0 V ? VB ? 16.0 V • Within the first 5 seconds of a recovery from an under or over voltage condition • Within the first 5 seconds of power up reset or a running reset • Bus off state is confirmed or ECU is recovering from a bus off condition	2500 ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ECU_ID_NOT_PROGRAMMED	P0602	This monitor checks if: • ECU ID not programmed at ECU/HCU assembly plant	• This fault will be latched, if there is no valid value for Security Data in NVRAM.	NVRAM_SECURE_CODE_BLK_ID == OxFF	• Power Switch is ON	1 count	Type A. MIL Illumination.
VCFG_OPTIONS_NOT_PROG	P0602	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	• The CHASSINF VCFG component extends the former Function Enable logic. It now combines EOL programming with NVRAM and CALibrations, in order to activate/enable functions, features, and subsystems. This means that functionality is present in the code, that will be suppressed until activated by the new VCFG settings.	VCFG settings are not programmed/not available Vcfg_Options_Enable[VCFG_OPTIONS_ENABLE_BYTE_CAL] == (U8)VCFG_OPTIONS_CHECKS_SOME) OR (Vcfg_Options_Enable[VCFG_OPTIONS_ENABLE_BYTE_CAL] > (U8)VCFG_OPTIONS_CHECKS_NONE	• Power Switch is ON	1 count	Type A. MIL Illumination.
VAFCALIBRATIONINVALID	P0602	This monitor checks if: • Problem at signal source • Problem at message source module • Problem with bus wiring • Problem at message receiving module	VAF file not configured properly	None	• Power Switch is ON	1 count	Type A. MIL Illumination.
PB_MICRO_IPC_FAULT	U3000	This monitor checks if: S12 micro or Champion micro arithmetic failure, S12 micro or Champion micro SPI failure, EMC	• This fault sets when the Champion micro detects an IPC failure with the s12 micro	EPB Micro IPC Counter Fault = TRUE OR EPB Micro IPC CRC Fault = TRUE OR EPB Micro not initializing (not alive)	Continuous	50 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_RAM_FAULT	P0604	This monitor checks if: S12 micro RAM failure	Each RAM cell is consecutively written with test patterns, read back and compared with the expected value. In case of a disagreement, the fault is set At startup, the complete RAM is checked this way, during cyclic operation the RAM is checked cell by cell in the idle loop (complete check « 1s in normal operation, 17 s in sleep mode)	Freescale Micro SW does an initial RAM check and a cyclical RAM check To perform a RAM test, a RAM area is written with a special pattern and read back to check its correctness	Continuous	10 msec	*Type A.* MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_MICRO_ROM_FAULT	C0616	This monitor checks if: S12 micro ROM failure, S12 micro ALU/instruction set fault	S12 micro calculates a CCITT CRC16 checksum over the complete FLASH memory. If that does not match with the stored checksum, the fault is set The complete ROM is checked during startup, it is consecutively checked during normal operation (complete check takes 1.28 s) and in sleep mode (complete check takes approx. 60 seconds)	Each ROM section is checksummed byte by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the setion is verified for a correct checksum stored at the end of the section.	Continuous	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_STACK_FAULT	U3000	This monitor checks if: S12 micro wrong program execution, instruction execution faults, addressing faults.	Below and above the RSTACK and CSTACK areas of memory, 16 bit RAM cells are written with a pattern. In case of a stack fault, this pattern will be overwritten and very likely changed by that. All patterns are periodically checked that they are not changed	To detect underflow and overflow of the system stacks, a word of RAM is reserved at the end of each of the system stacks. A word of RAM is also reserved at the upper-most address of the stack section. To detect cases where the application exception could be pushing a value onto the stack that matches the test value, the test value that is stored at these reserved addresses will be changed each update. Stacks checked are the: UNDEFINED_MODE_STACK, SUPERVISOR_MODE_STACK, FIQ_MODE_STACK. IRQ_MODE_STACK. If the reserved stack which contains a pattern is overwritten, a fault will be set	Continuous	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MOTOR_SUPPLY_OC	C0616	This monitor checks if: • open supply	Precondition: no FC_A2D_REFERENCE_FAULT detected! When the measured Motor Supply Voltage is less than 2V the Fault is set.	Motor Supply Voltage < 2v	• No Actuation	160 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MOTOR_SUPPLY_OC_RR	C0616	This monitor checks if: • open supply	Precondition: no FC_A2D_REFERENCE_FAULT detected! When the measured Motor Supply Voltage is less than 2V the Fault is set.	Motor Supply Voltage < 2v	• No Actuation	160 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_ADC_REFERENCE_FAULT	C0616	This monitor checks if: ECU internal defect. Incorrect 5V supply from ASIC.	The conversion of all input voltages on the S12 micro is based on an ADC reference voltage. This fault indicates this voltage is outside of expected tolerance so none of the voltage readings can be considered accurate.	The EPB Micro fault flag PB_MICRO_ADC_REFERENCE_FAULT = True	Filtered system voltage >= 7.5V AND SYSTEM_VOLTAGE_EXCESSIVE_LOW fault not set.	50 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_MICRO_ADC_CAL_DATA_IMPLAUSIBLE	C0616	This monitor checks if: Wrong calibration, ECU defect	Each S12 micro ADC input has calibration data saved in the EEPROM in Main micro, which is sent from the Main micro to the S12 micro at Initialization multiple times. If all "versions" of these calibrations do not match, the ADC calibration data is considered implausible.	Gain values and offset values are compared between the main micro and the EPB micro. If values disagree, fault is set.	• Periodic	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_ADC_CAL_FAULT	C0616	This monitor checks if: Wrong calibration, ECU defect	This fault is set if valid ADC calibration data is never received by the S12 micro.	Periodic ADC calibration indicates that calibration data is invalid	• Periodic	1000 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PBMICROECCFAILURE	U3000	This monitor checks if: S12 micro memory controller defect	The S12 micro's memory controller has a test mode in which a memory error can be injected when writing to memory. When reading from that faultily written memory cell and the ECC logic does not detect the fault as expected, the monitor fails	ECC failure detected at time ROM is read for use or when a background ROM check fails	• Periodic	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_S12_IPC_FAULT	U3000	This monitor checks if: • Communication error • Crosstalk or arbitration problem	• This fault sets when the s12 micro detects an IPC failure with the Champion micro	• Set when the S12 detects an IPC failure: • ID • Rolling count • Checksum • Length	• EPB micro initialized	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_MICRO_SWITCH_DISCONNECTED_LIN	U1122	This monitor checks if: • Switch disconnected • Defective LIN transceiver • LIN communication error	The EPB switch pattern has to be stable in the state "DISCONNECTED" (LIN bus communication is disturbed). The stability check takes between 80ms and 150ms. Afterwards the fault qualification is started. The total fault detection-time is increased by the delay of the stability check.	Switch disconnected pattern observed	• continuous	1200 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_MOTOR_MISSING_INITIALIZATION_ERROR	C0616	This monitor checks if: • Calibration values for EPB are missing or out of range	• During initialization, the Park Brake motor offset and gain values are read from NVRAM. If the values are not within an acceptable range, the SW will use default values from ROM.	Calibration values in NVRAM are missing or out of range	• Runs during initialization	10 msec	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_LOGICAL_SEQ_MONITOR	C0616	This monitor checks if: Defective ECU	• Fault is detected by Mando PBC	Program Sequence Fault detected	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: Dynamic or Static state Exceptions: none	See Detection Rules (fault is detected by Mando PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_RUN_IN_NOT_DONE	C0616	This monitor checks if: Assembly check has not been performed yet	• Fault is detected by Mando PBC	Assembly Test Not Done	Vehicle Power Mode: OFF, ACCESSORY, RUN, Cranking Vehicle Operating Conditions: Dynamic and Static state Exceptions: none	See Detection Rules (fault is detected by Mando PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_POWERDOWN_EEPROM_FAILED	C0616	This monitor checks if: Unexpected Powerdown, Invalid EE • brakestate data, Actuation interrupted and not resumed in time or aborted	• Fault is detected by Mando PBC	Actuator status is UNKNOWN due to unexpected power down or EEPROM failure	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: Dynamic, static state Exceptions: Disabled by calibration, Assembly check is not done	See Detection Rules (fault is detected by Mando PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_HOST_UN AVAILABLE	C0616	This monitor checks if: Host SW shutdown EPB actuation	• Fault is detected by Mando PBC	Host is not available	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: Dynamic, static state Exceptions: Disabled by calibration, Non-operational mode	See Detection Rules (fault is detected by Mando PBC)	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PB_APPLY_ENABLE_WRONG_STATE	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	Monitor routine calculates the expected apply enable state using the same algorithms and input parameters as S12 micro and compares the expected state to the real state of the related FET's enable line.	No successful FET activation	Continuous failsafing	40 s	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_APPLY_ENABLE_NO_CONTROL	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	FET is requested to be activated, but the monitoring shows the FET as unactivated.	No successful FET activation	Continuous failsafing	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_RELEASE_ENABLE_WRONG_STATE	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	Monitor routine calculates the expected apply enable state using the same algorithms and input parameters as S12 micro and compares the expected state to the real state of the related FET's line.	No successful FET activation	Continuous failsafing	40 s	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_RELEASE_ENABLE_NO_CONTROL	C0616	This monitor checks if: S12 micro/Zenon hardware fault. FET SC/OC.	FET is requested to be activated, but the monitoring shows the FET as unactivated.	No successful FET activation	Continuous failsafing	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
EPB_COMMAND_RANGE_ERROR	C0616	This monitor checks if: • EPB decel request out of range	• This failsafe monitors the decel request received from the EPB and checks to see if it is out of range	Decel Request from EPB is greater than 9.83 m/s	• Continuous failsafing	250 msec	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
PBC_CRANKING_TIMEOUT	C0616	This monitor checks if: Power mode is Cranking	• When power mode is cranking, suspend actuation as long as it is cranking until timeout after 5 seconds	When Power Mode = Cranking, Then Suspend actuation as long as it is cranking and also provide the following options to Mando: 1. Timeout after 5 seconds and set the fault 2. Continue actuation	Power mode is Cranking	5 sec	Type C, No MIL, "Emissions Neutral Diagnostic "
PB_HSB_INIT_FAULT	C0616	This monitor checks if: • Failure of the Host Safety Barrier to complete its normal initialization.	• The HSB self test is included in the system self test, and it is run to ensure that the HSB still has control over the apply/release enable lines. This fault also sets if indeterminate states of the enable lines are detected.	HSB Initialization Failed	Runs during system self test	10 ms	Type C, No MIL, "Emissions Neutral Diagnostic "
EPB_ASSIST_CURRENT_FEEDBACK_EXCEEDED	C0616	This monitor checks if: Excessive clamp force request. Ex.	Feedback current > 13.5 amps for 300 msec or Feedback current > 16.6 amps for 20 msec while the motor is being requested to apply clamp force	Feedback current > 13.5 amps for 300 msec or Feedback current > 16.6 amps for 20 msec	Runs continuusly during EPB Assist	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "
EPB_ASSIST_CURRENT_FEEDBACKJMPLAUSIBLE	C0616	This monitor checks if: Request for clamp force with no feedback	If during EPB assist active control the current feedback doesn't eceeded min current for x number of requests for activation	Feedback Current < Min Current for > 150 msec. The results in 1 count	Runs continuusly during EPB Assist	>= 4 counts	Type C, No MIL, "Emissions Neutral Diagnostic "
PBC_HOST_IGNORED_COMMAND	C0616	This monitor checks if: Defective ECU, or wrong conditions when EPB actuation was requested	PBC detects this fault if "Motor Driver State" does not change to current value of "Motor Command" for over 100ms, PBC sets FaultStatus[33] as 'Failed' and cancel the current actuation request (MotorCommand = STOP and then NONE) (Refer VDA #R3.177)	"Motor Driver State" does not change to current value of "Motor Command" for over 100ms	Vehicle Power Mode: OFF, ACCESSORY, RUN Vehicle Operating Conditions: static state Exceptions: Disabled by calibration, Non-operational mode	100ms	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
TASKOVERRUNCOREO	P0606	This monitor checks if: Software Error ECU Hardware Failure Input Signals To ECU causing high interrupt load	A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set.	multiple activation counter >= max number of activations Task_Overrun_Cnt>0	Always Enabled	9 counts Time: 10 ms Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit.	Type A. MIL Illumination.
TASK_OVERRUN_CORE1	P0606	This monitor checks if: Software Error ECU Hardware Failure Input Signals To ECU causing high interrupt load	A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set.	multiple activation counter >= max number of activations Task_Overrun_Cnt>0	Always Enabled	9 counts Time: 10 ms Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit.	Type A. MIL Illumination.
TASKOVERRUNCORE2	P0606	This monitor checks if: Software Error ECU Hardware Failure Input Signals To ECU causing high interrupt load	A timer alarm used to activate a periodic task expires and the prior activation/execution of this task has not run to completion. If the number of multiple activations allowed (2) for the task has already been reached a fault is set.	multiple activation counter >= max number of activations Task_Overrun_Cnt>0	Always Enabled	9 counts Time: 10 ms Note: Although weight and goal implies setting after 2 occurrences, faults sets 10 ms later after the 1st occurence of 2 overruns in a row due to latching of the fault bit.	Type A. MIL Illumination.
RUNNING_RESET_FAILURE	P0562	This monitor checks if: • Keep Alive Voltage Regulator not functional. • Processor looses complete power (system voltage). • Processor is incorrectly reset.	• Two blocks in NVRAM are used to failsafe the systems mode manager's ability to control the system shutdown process. During system initialization (each new ignition cycle), the contents of these two blocks are compared. If a mismatch is found, it indicates that mode manager was unable to control the system shutdown process on the previous ignition cycle. • Counter: Count 1-up • Monitor Rate: 10ms Note- This fault also sets when there is a startup after an improper shutdown with the vehicle not in park AND with the drivers foot on the brake pedal.	System failed to finish NVRAM update on the last module shut-down (ex. Disconnect battery from module before shutdown)	• System is not re-initializing AND • System is not shutting down	5ms	Type C, No MIL, "Emissions Neutral Diagnostic "
MPU_FAULT_TRW_SCS_COREO	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission.	None	Always Enabled	10 ms	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
MPU_FAULT_TRW_SCS_CORE1	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission.	None	Always Enabled	10 ms	Type A. MIL Illumination.
MPU_FAULT_TRW_SCS_CORE2	P0606	This monitor checks if: Software Error Partial Microcontroller Failure	Memory Protection Unit (MPU) detects an attempted memory access where there is no defined address range providing the needed permission.	None	Always Enabled	10 ms	Type A. MIL Illumination.
ITBCLSMFAULT	P0606	This monitor checks if: If the ITBC tasks execute out of order, or if a task is skipped or if the tasks do not complete, then this fault is set.	Set this fault , if the order of execution of ITBC tasks is not correct. If the tasks skip or if some tasks are left incomplete	None	• LIN communication	10 msec	Type A. MIL Illumination.
ICC_FAILURE_COREO	P0606	This monitor checks if: ICC send or receive have been skipped.	ICC failsafe mechanism determines if any ICC receives or sends were skipped, At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault. The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot.	At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot.	Always Enabled	60 msec	Type A. MIL Illumination.
ICCFAILURECORE1	P0606	This monitor checks if: ICC send or receive have been skipped.	ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault. The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot.	At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot.	Always Enabled	60 msec	Type A. MIL Illumination.

Component/ System	Fault Code	Monitoring Strategy Description	Fault Detection Criteria	Threshold Value	Secondary Parameter and Enable Condition	Maturation Time	MIL Illumination
ICC_FAILURE_CORE2	P0606	This monitor checks if: ICC send or receive have been skipped.	ICC failsafe mechanism determines if any ICC receives or sends were skipped. At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot. In case it was skipped the failsafe matures the ICC fault. The failsafe also tries to get back the ICC receives and sends to work normally from the next 10ms Slot.	At the beginning of every 10ms slot, every core in the scheduler runs the failsafe that checks if any of the ICC sends or receives were skipped in the previous 10ms slot.	Always Enabled	60 msec	Type A. MIL Illumination.
MISSING_FLY_BACK_DIODE_FAULT	U3000	This monitor checks if: • Fly Back Diode is Missing	• This fault only runs if SW is compiled with DEVEL on	SW detects that a fly back diode is missing	• Power Switch is ON	1 count	Type C, No MIL, "Emissions Neutral Diagnostic "

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
CGM Control Module Memory Failure	B2B12	This DTC monitors for a CGM Control Module Memory Failure error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Control Module Memory Failure DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
CGM Control Module Internal Performance Failure	B2B13	This DTC monitors for a CGM Control Module Internal Performance Failure error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the CGM Control Module Internal Performance Failure DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Performance	C0522	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal rationalized against the TOSS vehicle speed acceleration. The diagnostic monitor can be designed to detect an invalid longitudinal acceleration signal based on the TOSS vehicle speed windows and TOSS vehicle speed acceleration, 4 windows can be enabled. The delta between the TOSS vehicle speed acceleration and longitudinal acceleration signal is taken within each window to verify the delta is small, no failure indicated, or the delta is large indicating the longitudinal acceleration signal is in error. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	> 0.2500 g	battery voltage run crank voltage diagnostic monitor enable region 1 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed	> 11.00 volts > 11.00 volts = 1 Boolean = 0 Boolean > 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g < 0.70 % > 80.0 Nm > 0.1500 g > 15.0 KPH < 200.0 KPH	raw longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 1 fail time > 75.0 seconds out of region 1 sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	> 0.0500 g	battery voltage run crank voltage diagnostic monitor enable region 2 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal)	> 11.00 volts > 11.00 volts = 1 Boolean = 0 Boolean > 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g	raw lateral longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 2 fail time > 75.0 seconds out of region 2 sample time > 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	 < 0.70 % > 80.0 Nm > 0.1500 g > 0.0 KPH < 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	> 0.0500 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = 0 Boolean > 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	raw lateral longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate region 3 fail time > 75.0 seconds out of region 3 sample time > 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g < 0.70 % > 80.0 Nm < 0.1000 g > 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	> 0.0500 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable	> 11.00 volts > 11.00 volts = 1 Boolean = 0 Boolean > 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE	raw lateral longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					diagnsotic fault sequence gear active	= FALSE	region 4 fail time > 75.0 seconds out of region 4 sample time > 120.0 seconds, 50 millisecond update rate	
					P0716 fault active	= FALSE		
					P0716 test fail this key on	= FALSE		
					P0717 fault active	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF fault active	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 fault active	= FALSE		
					P07C0test fail this key on	= FALSE		
					attained gear	= 1st thru 10th		
					ABS(raw longitudinal acceleration signal) AND	> 0.5300 g		
					ABS(raw longitudinal acceleration signal)	< 3.8500 g		
					update region 4 sample time:			
					brake pedal position	< 0.70 %		
					engine torque	< 80.0 Nm		
					TOSS vehicle speed acceleration	< 0.1500 g		
					TOSS vehicle speed	> 0.0 KPH		
					TOSS vehicle speed	< 0.0 KPH		
					ABS(raw longitudinal acceleration signal) update sample time	< 0.5300 g		
					U0073 fault active	= FALSE		
					U0073 test fail this key on	= FALSE		
					DTCs not fault active	VehicleSpeedSensor_FA VehicleSpeedSensorError		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Circuit Low	C0553	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 Q impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw longitudinal acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Circuit High	C0554	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	raw longitudinal acceleration signal when sensor type is directly proportional OR raw longitudinal acceleration signal when sensor type is inversely proportional update raw longitudinal acceleration signal stability time, fail and sample time, 50 millisecond update rate	> 3.8500 g < 3.8500 g (< 0.5 Q impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw longitudinal acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Circuit Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 Q impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Circuit High	C1250	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	> 3.8500 g < 3.8500 g (< 0.5 Q impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Performance	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	> 0.5300 g < 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	> 11.00 volts > 11.00 volts = 1 Boolean > 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor A	PO016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses less than or greater than nominal position in one cam revolution.	-8.1 Crank Degrees 10.1 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning No Active DTCs: Time since last execution of diagnostic	 CrankSensor_FA P0340, P0341 < 0.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit Performance (OAT wired to ECM)	P0071	Detects an Outside Air Temperature (OAT) sensor that is stuck in range. There are two components to the test: an engine off component, and an engine running component. If the engine has been off for a long enough period of time, and the coolant temperature and Intake Air Temperature (IAT) values are similar, then the air temperature values in the engine compartment of the vehicle are considered to have equalized. In this case, the engine off component of the diagnostic can be enabled. If the IAT and the OAT values are similar, then the OAT Performance Diagnostic passes. If the IAT and OAT values are not similar, the diagnostic will continue to monitor the IAT and the OAT as the vehicle starts to move. For applications that have ability to move without engaging the internal combustion	**<u>Engine Off:</u>** If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	> 20.0 deg C > 20.0 deg C <= 20.0 deg C <= 20.0 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Engine is not running Vehicle Speed Coolant Temperature - IAT IAT - Coolant Temperature OAT-to-IAT engine off equilibrium counter The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off** No Active DTCs:	>= 28,800.0 seconds >= 15.5 MPH < 15.0 deg C < 15.0 deg C >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA	Executed every 100 msec until a pass or fail decision is made	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		engine, the engine off test will continue. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.				EngineModeNotRunTimer Error		
			Engine Running: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	> 20.0 deg C > 20.0 deg C <= 20.0 deg C <= 20.0 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine airflow OAT-to-IAT engine running equilibrium counter The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Eguilibrium Engine Running** No Active DTCs:	>= 28,800.0 seconds >= 15.5 MPH >= 10.0 grams/second >= 300.0 counts VehicleSpeedSensor_FA	Executed every 100 msec until a pass or fail decision is made	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		If the engine off component of the diagnostic was enabled, but did not make a pass or fail decision, the engine running component will begin executing when the internal combustion engine starts to run. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine running equilibrium counter". The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine running equilibrium counter" is counting, IAT and OAT are monitored for				IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit Low	P0072	Detects a continuous short to ground in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too low. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw OAT Input	<= 46 Ohms (-150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit High	P0073	Detects a continuous open circuit in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too high. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw OAT Input	>= 427,757 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	Detects a noisy or erratic signal in the Outside Air Temperature (OAT) circuit by monitoring the OAT sensor and failing the diagnostic when the OAT signal has a noisier output than is expected. When the value of the OAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of OAT readings. The result of this summation is called a “string length”. Since the OAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic OAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)	> 100 deg C 10 consecutive OAT readings	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Too Low	P0087	Determines if rail pressure is below an absolute value.	Rail pressure	< 0 to 15 MPa (see table **P0087 Minimum rail pressure)**	Powertrain relay voltage Engine running, cranking excluded, for a time No IFT running (refer to FUL_IFT_St) Engine shut off request LowFuelConditionDiagnostic Fuel pressure estimated at high pressure pump inlet validity Fuel pressure estimated at high pressure pump inlet FuelPumpRlyCktFA FHP_MU_ZeroDeliveryFlt FHP_PR_FullDischargeFlt	>= 11.0V >= 30.00 s == False == False == True >= 400.00 kPa == False == False == False	121 failures out of 242 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 Performance	P0089	Determines when rail pressure is above maximum threshold when pressure is governed by Fuel Metering Unit valve.	Rail pressure	> 68 to 268 MPa (see table **P0089 Maximum rail pressure with MU)**	Powertrain relay voltage Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)*	>= 11.0V == True	121 failures out of 242 samples OR 121 continuous failures 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit	P0090	This DTC detects an Open Circuit on the Fuel Metering Unit valve	Current low across High and Low Side drivers during ON state indicates an open circuit.	Impedence between High Side and Low Side pins of the Fuel Metering Unit valve > 200 kQ	Powertrain relay voltage Engine cranking Run crank active	> 11.00 V == FALSE ==TRUE	7 failures out of 14 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit Low Voltage	P0091	This DTC detects a short circuit to ground of the Low Side driver circuit of the Fuel Metering Unit valve	Voltage low across Low Side driver during OFF state indicates short-to-ground.	Impedence between Low Side pin of the Fuel Metering Unit valve and the controller ground < 0.5 Q.	Powertrain relay voltage Engine cranking Run crank active	> 11.00V == FALSE ==TRUE	7 failures out of 14 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 1 Control Circuit High Voltage	P0092	This DTC detects a short circuit to power of the Low Side driver circuit of the Fuel Metering Unit valve	Voltage high across Low Side driver during ON state indicates short to power.	Impedence between Low Side pin of the Fuel Metering Unit valve and the controller power < 0.5 Q.	Powertrain relay voltage Engine cranking Run crank active	> 11.00V == FALSE ==TRUE	7 failures out of 14 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Circuit Performance (applications with IAT, IAT2 and IAT3)	P0096	Detects an Intake Air Temperature 2 (IAT2) sensor value that is stuck in range by comparing the IAT2 sensor value against the IAT and IAT3 sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT3 values are similar, and the IAT2 value is not similar to the IAT and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT2 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**Good Correlation Between IAT and IAT3** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C <= 25 deg C > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			Not Good Correlation, IAT in Middle Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT2) > ABS(Power Up IAT - Power Up IAT3)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ignition cycle if the enable conditions are met.	**<u>Not Good Correlation, IAT3 in Middle</u>** Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 2 Low (applications with LIN MAF)	P0097	Detects an erroneously low value being reported over the LIN serial connection from the Intake Air Temperature 2 (IAT2) sensor. The diagnostic monitors the IAT2 sensor output temperature and fails the diagnostic when the IAT2 temperature is too low. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT 2 Temperature	< -60 degrees C	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 2 High (applications with LIN MAF)	P0098	Detects an erroneously high value being reported over the LIN serial connection from the Intake Air Temperature 2 (IAT2) sensor. The diagnostic monitors the IAT2 sensor output temperature and fails the diagnostic when the IAT2 temperature is too high. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT 2 Temperature	> 150 degrees C	Dianostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Intermittent In-Range	P0099	Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected. When the value of the IAT2 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT2 readings. The result of this summation is called a “string length”. Since the IAT2 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT2 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff' = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 2 readings	Diagnostic is Enabled Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Radiator Coolant Temperature Sensor Performance (Diesel L6 ATM)	P00B2	This DTC detects either a biased high or low RCT (Radiator Coolant Temperature) sensor. This is done by comparing the RCT sensor output to two other temperature sensor outputs after a soak condition.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadiatorCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The comparison sensors, temperature thresholds,		Diagnostic is Enabled No Active DTC's Propulsion system Inactive timer error Sensor under diagnosis is not faulted Used comparison sensors are not currently faulted: - BiasChkCylHdCIntSnsr - BiasChkBlockClntSnsr - BiasChkEnglnCIntSnsr - BiasChkEngOutCIntSnsr - BiasChkHtrCrlnCIntSnsr - BiasChkHtrCrOutCInSnsr - BiasChkRadOutCIntSnsr - BiasChkBypInCIntSnsr - BiasChkEngMetalSnsr - BiasChklntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSnsr - BiasChk_EGR_DwnStmSnsr -	 OAT_PtEstFiltFA PSAR_PropSyslnactveCrs_FA = FALSE EECR_RadiatorOutlet_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_Enginelnlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCorelnlet_CktFA EECR_HeaterCoreOutlet_CktFA EECR_RadiatorOutlet_CktFA EECR_Bypasslnlet_CktFA EECR_CylHeadMetal1_CktFA IAT_SensorFA HumTempSnsrFA MnfdTempSensorFA OAT_AmbientSensorFA EngOilTempFA EGRTempSensorUPSS_FA	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number. **Engine Outlet:** CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B: **Engine Block:** CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkEngOutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Engine Inlet:**	12.25 °C 6.75 °C 20.60 °C 6.60 °C	BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors ----------------- The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Metal:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Radiator Outlet:** Propulsion Off Soak Time Ambient Air Temperature -----------------	EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible > 21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkEng MetalSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OutCIntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Cylinder Head Metal A:** CeEECR_e_PhysSnsr8 Comparison sensor 1: CeEECR_e_BiasChkEng OutCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrOutClnSnsr Comparison sensor 2: CeEECR_e_BiasChkRad OutCIntSnsr	22.50 °C 7.25 °C 12.50 °C 6.75 °C	Comparison sensor 1 & 2 are not Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application: 2x2 signature	= CeEECR_e_BiasChkNoS election Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrBlock ClntSnsr CeAEHR_e_BlkHtrRadO utCIntSnsr >7.40 °C >21,600 seconds >21,600 seconds >-20.00 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkHtrCrlnCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngInCIntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkOutsideAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A:	12.67 °C 7.50 °C 12.67 °C 7.50 °C 16.46 °C 16.46 °C	Absolute Drop IAT Drop Temperature Derivative **2x2 Signature Criteria:** The warm sensors Sensor 1: Sensor 2: The cool sensors Sensor 1: Sensor 2: A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold) **Absolute Drop Criteria:** The is monitored for a drop. The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR	Enabled Enabled Disabled Disabled CeAEHR_e_BlkHtrEngOutCIntSnsr CeAEHR_e_BlkHtrEngMetalSnsr CeAEHR_e_BlkHtrRadOutCIntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr 5.0 °C 5.0 °C >10.0°C CeAEHR_e_BlkHtrBlockClntSnsr > 87.00 L/min 0.1 - 17.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Threshold B: A failure will be reported if any of the following conditions are met. Evaluated in order: 1) This sensor is above both comparison sensors 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	>A °C >A °C >B °C >B °C	Insufficent coolant flow is present for A block heater is detected if a drop is **IAT Drop Criteria:** The sensor will be used as IAT for this method A block heater will be detected if: IAT has a drop of during a drive defined by: Drive time Vehicle speed Addtional drive time is provided when vehicle speed drops below above threshold as follows This detection method will abort if the engine is off OR Engine runtime **Temperature Derivative Criteria:** Derivative will be monitored using Derivative will be monitored once coolant flow is AND	<77.0 seconds >1.8 °C CeAEHR_e_BlkHtrIntakeAirSnsr >5.0 °C >400.0 seconds >24.0 kph 0.5 times the seconds with vehicle speed below the threshold above > 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrBlockClntSnsr >-1.00 L/min		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected =================	5.0 - 15.0 seconds < 75.0 seconds <-0.10°C/sec > 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Radiator Coolant Temp Sensor Circuit Low Voltage (Diesel L6 ATM)	P00B3	Circuit Continuity This DTC detects a short to ground in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. This is accomplished by monitoring the resitance of the circuit. If the resistance goes out of the expected range the DTC is set.	RCT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8:	< X Ohms X is equal to: Temp Sensor 1: 49 Ohms Temp Sensor 2: 48.8 Ohms Temp Sensor 3: 43.2 Ohms Temp Sensor4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 6: 62.3 Ohms Temp Sensor?: 48.8 Ohms Temp Sensor 8: 62.3 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Radiator Coolant Temp Sensor Circuit High Voltage (Diesel L6 ATM)	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8:	> X Ohms X is equal to: Temp Sensor 1: 230,546 Ohms Temp Sensor 2: 230,546 Ohms Temp Sensor 3: 338,540 Ohms Temp Sensor4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 6: 380,707 Ohms Temp Sensor 7: 230,546 Ohms Temp Sensor 8: 380,707 Ohms	Diagnostic is Enabled Engine run time OR IAT min	 > 10.0 seconds > -20.0 °C	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Radiator Coolant Temperature Sensor Circuit Intermittent/ Erratic (Diesel L6 ATM)	P00B5	Circuit Erratic This DTC detects large step changes in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt		Diagnostic is Enabled No Active DTC's	 EECR_RCT_Erratic_TFTKO EECR_RCT_CktHiLo_FA	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The calculated high and low limits for the next reading use the following calibrations: Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	3.1 seconds -60.0 °C 150.0 °C 2.4 seconds -60.0 °C 150.0 °C 3.6 seconds -60.0 °C 150.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 4.0 seconds -60.0 °C 250.0 °C 3.4 seconds -60.0 °C 150.0 °C 4.0 seconds -60.0 °C 250.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Multiple Pressure Sensor Correlation Performance (2 intake air pressure sensor configuration)	P00C7	This monitor is used to identify if BARO and MAP pressure values are irrational when compared to each other. The plausibility monitor compares the BARO and MAP pressures when the engine is not running. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The BARO and MAP sensors values are checked to see if they are within the normal expected atmospheric pressure range. If they are, then MAP and BARO are compared to see if their values are similar. If the two sensors are not in agreement the monitor is not able to pinpoint the sensor(s) that is/are not working correctly and therefore indicates that there is a fault that impacts the two sensors.	Difference (absolute value) in measured pressure between MAP sensor and BARO sensor	> 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure No Active DTCs: No Pending DTCs:	> 5.0 [s] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5 ms for applications without LIN MAF sampling time is 25 ms for applications with LIN MAF	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid Supply Voltage Control Circuit Low	P00C9	This DTC detects a short circuit to ground of the high side driver circuit of the Fuel Metering Unit valve	Voltage high across High Side driver of the Fuel Metering Unit valve during ON state indicates short toground	Impedence between High Side pin of the and the controller ground < 0.5 Q	Powertrain relay voltage Engine cranking Run crank active	> 11.00 V == FALSE ==TRUE	7.00 failures out of 14.00 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid Supply Voltage Control Circuit High	POOCA	This DTC detects a short circuit to high voltage of high side driver circuit of the Fuel Metering Unit valve	Voltage low across High Side driver of the Fuel Metering Unit valve during OFF state indicates short to power	Impedence between High Side pin of the Fuel Metering Unit valve and the controller power < 0.5 Q	Powertrain relay voltage Engine cranking Run crank active	> 11.00 V == FALSE ==TRUE	7.00 failures out of 14.00 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 3 Circuit Performance	P00E9	Detects an Intake Air Temperature 3 (IAT3) sensor value that is stuck in range by comparing the IAT3 sensor value against the IAT and IAT2 sensor values and failing the diagnostic if the IAT3 value is more different than the IAT and IAT2 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT2 values are similar, and the IAT3 value is not similar to the IAT and IAT2 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT3 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per ignition cycle if the	**<u>Good Correlation Between IAT and IAT2</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	<= 25 deg C > 25 deg C > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time (Engine Coolant Temp - Outside Ambient Temp) No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds <= 13.0 Deg C PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT in Middle</u> Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		enable conditions are met.			LIN communications established with MAF			
			<u>Not Good Correlation, IAT2 in Middle</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3) > ABS(Power Up IAT2 - Power Up IAT)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 3 Low	POOEA	Detects a continuous short to ground in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too low. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT 3 Input	< 49.14 Ohms (-150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 3 High	POOEB	Detects a continuous open circuit in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too high. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT 3 Input	> 169,523 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 3 Intermittent In-Range	POOEC	Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected. When the value of the IAT3 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT3 readings. The result of this summation is called a “string length”. Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 3 readings	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit Low (applications with LIN MAF)	P00F4	Detects an eroneously low value being reported over the LIN serial connection from the humidity sensor. The diagnostic monitors the humidity sensor relative humidity output and fails the diagnostic when the humidity percentage is too low. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity percentage value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	Relative Humidity	<= -6.25 %	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit High (applications with LIN MAF)	P00F5	Detects an eroneously high value being reported over the LIN serial connection from the humidity sensor. The diagnostic monitors the humidity sensor relative humidity output and fails the diagnostic when the humidity percentage is too high. The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity percentage value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	Relative Humidity	>= 106.25 %	Diagnostic is Enabled Powertrain Relay Voltage for a time LIN Communications established with MAF No Active DTCs:	 >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Humidity Sensor Circuit Intermittent	P00F6	Detects a noisy or erratic signal in the humidity circuit by monitoring the humidity sensor and failing the diagnostic when the humidity signal has a noisier output than is expected. When the value of relative humidity in % is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of humidity readings. The result of this summation is called a “string length”. Since the humidity signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic humidity signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current Humidity reading - Humidity reading from 100 milliseconds previous)	> 80 % 10 consecutive Humidity readings	Diagnostic is Enabled Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure (MAP) Sensor Performance (3 intake air pressure sensor configuration)	P0106	This monitor is used to identify MAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If the MAP sensor value is within the normal expected atmospheric range, then MAP, TCIAP and BARO are compared to see if their values are similar. If the TCIAP and BARO sensor values are similar, but the MAP value is not similar, then a MAP performance diagnostic will fail. If MAP sensor is not in agreement with the other two the monitor is able to pinpoint MAP as the faulty sensor.	Difference (absolute value) in measured pressure between MAP sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor	> **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	480.00 fail counters over 600.00 sample counters sampling time is 12.5 ms for applications without LIN MAF sampling time is 25 ms for applications with LIN MAF	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit Low (with pull-up)	P0107	Detects a continuous short to ground in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 7.5 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit High (with pull-up)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 90.0% of 5 Volt Range (This is equal to 390.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Performance (applications with IAT, IAT2 and IAT3)	P0111	Detects an Intake Air Temperature (IAT) sensor value that is stuck in range by comparing the IAT sensor value against the IAT2 and IAT3 sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT2 and IAT3 values are similar, and the IAT value is not similar to the IAT2 and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**<u>Good Correlation Between IAT2 and IAT3</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C > 25 deg C <= 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT2 in Middle</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ignition cycle if the enable conditions are met.	**Not Good Correlation, IAT3 in Middle** Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >=11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Low (applications with LIN MAF)	P0112	Detects an erroneously low value being reported over the LIN serial connection from the Intake Air Temperature (IAT) sensor. The diagnostic monitors the IAT sensor output temperature and fails the diagnostic when the IAT temperature is too low. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT Temperature	< -60 degrees C	Diagnostic is Enabled LIN Communications established with MAF		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit High (applications with LIN MAF)	P0113	Detects an erroneously high value being reported over the LIN serial connection from the Intake Air Temperature (IAT) sensor. The diagnostic monitors the IAT sensor output temperature and fails the diagnostic when the IAT temperature is too high. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	IAT Temperature	> 150 degrees C	Diagnostic is Enabled LIN Communications established with MAF		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic signal in the Intake Air Temperature (IAT) circuit by monitoring the IAT sensor and failing the diagnostic when the IAT signal has a noisier output than is expected. When the value of the IAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT readings. The result of this summation is called a “string length”. Since the IAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT readings	Diagnostic is Enabled LIN communications established with MAF		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor Performance (Diesel L6 ATM)	P0116	This DTC detects either a biased high or low ECT (Engine Coolant temperature) sensor. This is done by comparing the ECT sensor output to two other temperature sensor outputs after a soak condition.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The comparison sensors, temperature thresholds, and aux heater effects		Diagnostic is Enabled No Active DTC's Propulsion system Inactive timer error Sensor under diagnosis is not faulted Used comparison sensors are not currently faulted: - BiasChkCylHdCIntSnsr - BiasChkBlockClntSnsr - BiasChkEngInCIntSnsr - BiasChkEngOutCIntSnsr - BiasChkHtrCrInCIntSnsr - BiasChkHtrCrOutCInSnsr - BiasChkRadOutCIntSnsr - BiasChkBypInCIntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSn	OAT_PtEstFiltFA PSAR_PropSyslnactveCrs_FA = FALSE EECR_EngineOutlet_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_Enginelnlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCorelnlet_CktFA EECR_HeaterCoreOutlet_CktFA EECR_RadiatorOutlet_CktFA EECR_Bypasslnlet_CktFA EECR_CylHeadMetal1_CktFA IAT_SensorFA HumTempSnsrFA MnfdTempSensorFA OAT_AmbientSensorFA EngOilTempFA	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			can be looked up by finding the location associated with the physical (Temperature) sensor number.		sr - BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr	EGRTempSensorIIPSS_FA EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl		
					Comparison sensors	= Availible		
			Engine Outlet: CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B:	 12.25 °C 6.75 °C	The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature	 > 21,600 seconds >-20.0 °C		
			Engine Block: CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkEngOutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B:	 20.60 °C 6.60 °C	**Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Head Metal:** Propulsion Off Soak Time Ambient Air Temperature **Head Coolant:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature	 >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C		
			Engine Inlet: CeEECR_e_PhysSnsr1					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Comparison sensor 1: CeEECR_e_BiasChkEng MetalSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OutCIntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B:		**Radiator Outlet:** Propulsion Off Soak Time Ambient Air Temperature	>21,600 seconds >-20.0 °C		
					Comparison sensor 1 & 2 are not	= CeEECR_e_BiasChkNoS election		
			Cylinder Head Metal A: CeEECR_e_PhysSnsr8 Comparison sensor 1: CeEECR_e_BiasChkEng OutCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B:	22.50 °C 7.25 °C	Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor	Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrBlock ClntSnsr CeAEHR_e_BlkHtrRadO utCIntSnsr		
			Heater Inlet: CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrOutCInSnsr Comparison sensor 2: CeEECR_e_BiasChkRad OutCIntSnsr Fuel Operated heater:	12.50 °C 6.75 °C	If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature	>7.40 °C >21,600 seconds >21,600 seconds >-20.00 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkHtrCrlnClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngInClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInClntSnsr Comparison sensor 2: CeEECR_e_BiasChkOutsideAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B:	12.67 °C 7.50 °C 12.67 °C 7.50 °C	There are 4 different types of aux heater detection for this application: 2x2 signature Absolute Drop IAT Drop Temperature Derivative **2x2 Signature Criteria:** The warm sensors Sensor 1: Sensor 2: The cool sensors Sensor 1: Sensor 2: A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold) **Absolute Drop Criteria:** The is monitored for a drop. The drop will be monitored for once coolant flow is AND	Enabled Enabled Disabled Disabled CeAEHR_e_BlkHtrEngOutClntSnsr CeAEHR_e_BlkHtrEngMetalSnsr CeAEHR_e_BlkHtrRadOutClntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr 5.0 °C 5.0 °C >10.0 °C CeAEHR_e_BlkHtrBlockClntSnsr >87.00 L/min		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			A failure will be reported if any of the following conditions are met. Evaluated in order:	16.46 °C 16.46 °C	Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for	0.1 - 17.0 seconds <77.0 seconds > 300.0 seconds		
			1) This sensor is above both comparison sensors		A block heater is detected if a drop is	>1.8 °C		
			2) This sensor is below both comparison sensors	>A °C	**IAT Drop Criteria:** The sensor will be used as IAT for this method	CeAEHR_e_BlkHtrIntakeAirSnsr		
			3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew	>A °C >B °C	A block heater will be detected if: IAT has a drop of during a drive defined by: Drive time Vehicle speed	 >5.0 °C >400.0 seconds >24.0 kph		
			4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	>B °C	Addtional drive time is provided when vehicle speed drops below above threshold as follows	0.5 times the seconds with vehicle speed below the threshold above		
					This detection method will abort if the engine is off OR Engine runtime	> 180.0 seconds > 1,800 seconds		
					Temperature Derivative Criteria: Derivative will be monitored using			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected =================	CeAEHR_e_BlkHtrBlockClntSnsr >-1.00 L/min 5.0 - 15.0 seconds < 75.0 seconds > 300.0 seconds <-0.10°C/sec > 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temp Sensor Circuit Low (Diesel L6 ATM)	P0117	Circuit Continuity This DTC detects a short to ground in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8:	< X Ohms X is equal to: Temp Sensor 1: 49 Ohms Temp Sensor 2: 48.8 Ohms Temp Sensor 3: 43.2 Ohms Temp Sensor4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 6: 62.3 Ohms Temp Sensor 7: 48.8 Ohms Temp Sensor 8: 62.3 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temp Sensor Circuit High (Diesel L6 ATM)	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8:	> X Ohms X is equal to: Temp Sensor 1: 230,546 Ohms Temp Sensor 2: 230,546 Ohms Temp Sensor 3: 338,540 Ohms Temp Sensor4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 6: 380,707 Ohms Temp Sensor 7: 230,546 Ohms Temp Sensor 8: 380,707 Ohms	Diagnostic is Enabled Engine run time OR IAT min	 > 10.0 seconds > -20.0 °C	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent (Diesel L6 ATM)	P0119	Circuit Erratic This DTC detects large step changes in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt		Diagnostic is Enabled No Active DTC's	 ECT_Sensor_Ckt_FA EECR_EngineOut_Erratic_TFTKO	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The calculated high and low limits for the next reading use the following calibrations: Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 3.1 seconds -60.0 °C 150.0 °C 2.4 seconds -60.0 °C 150.0 °C 3.6 seconds -60.0 °C 150.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. ****************************	 4.0 seconds -60.0 °C 250.0 °C 3.4 seconds -60.0 °C 150.0 °C 4.0 seconds -60.0 °C 250.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the ECT (EngineCoolant temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an ECT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat or other fault.	Energy is accumulated after the first conbustion event using Range 1, 2 or 3: If the maxium energy is greater than as shown in the supporting tables prior to the Engine outlet coolant achieving the target a fault will be indicated. **Range 1 (Primary):** Ambient air temperature is between 10.0 and 52.0 °C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 43.1 °C. The target temperature for this range will not drop below 56.9 °C **Range 2 (Secondary):** Ambient air temperature is between -9.0 and 10.0° C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 45.0 °C. The target temperature for this range will not drop below 45.0 °	**P0128 Maximum Acculated Energy - Primary** **P0128 Maximum Acculated Energy - Secondary**	Diagnostic is Enabled No DTCs Engine soak time Engine run time Engine Outlet Coolant Temperature - Range 1: - Range 2: - Range 3: Devices in main cooling circuit are not in in device control If Engine RPM is continuously greater than for this time period Distance traveled	THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_FlowStuckOn_FA THMR_SWP_NoFlow_FA OAT_PtEstFiltFA VehicleSpeedSensor_FA EngineTorqueEstlnaccurate MAF_SensorFA ETHR_CoolantEnergyModel ETHR_RemedialActionLeveil ETHR_RemedialActionLevel2 ETHR_RemedialActionLevel3 EECR_EngineOutlet_FA > 1,800.0 seconds 10.0 - 1,800.0 seconds <37.5 °C <35.6 °C <35.6 °C 9,999 rpm 5.0 seconds >0.2 km	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			C **Range 3 (Tertiary):** Ambient air temperature is between -20.0 and -9.0 °C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 45.0 °C. The target temperature for this range will not drop below 45.0 °C	**P0128 Maximum Acculated Energy - Tertiary** This diagnostic models the net energy into and out of the cooling system during the warm-up process. The ten energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to transmission oil, heat loss to enviroment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and eat loss to autostop.	The diagnostic will abort if the temperature has dropped by after the customer has commanded the engine off	>5.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor Circuit Range/ Performance	P017B	This DTC detects if the EMT(Engine Metal Temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an EMT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat.	Energy is accumulated after the first conbustion event using Range 1, 2 or 3: If the maxium energy is greater than as shown in the supporting tables prior to the Engine outlet coolant achieving the target a fault will be indicated. **Range 1 (Primary):** Ambient air temperature is between 10.0 and 52.0 °C Cylinder Head Metal reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 43.1 °C. The target temperature for this range will not drop below 56.9 °C **Range 2 (Secondary):** Ambient air temperature is between -9.0 and 10.0 °C Cylinder Head Metal reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 45.0 °C. The target temperature for this range will not drop below 45.0 °C	**P017B Maximum Accumulated Energy - Primary** **P017B Maximum Accumulated Energy - Secondary**	Diagnostic is Enabled No DTCs Engine soak time Engine run time Cylinder Head Metal Temperature - Range 1: - Range 2: - Range 3: Devices in main cooling circuit are not in in device control If Engine RPM is continuously greater than for this time period Distance traveled	THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_FlowStuckOn_FA THMR_SWP_NoFlow_FA OAT_PtEstFiltFA VehicleSpeedSensor_FA EngineTorqueEstInaccurate MAF_SensorFA ETHR_CoolantEnergyModel ETHR_RemedialActionLevel1 ETHR_RemedialActionLevel2 ETHR_RemedialActionLevel3 EECR_CylHeadMetal_FA > 1,800.0 seconds 10.0 - 1,800.0 seconds <37.5 °C <35.6 °C <35.6 °C 9,999 rpm 5.0 seconds >0.2 km	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Range 3 (Tertiary): Ambient air temperature is between -20.0 and -9.0 °C Cylinder Head Metal reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 45.0 °C. The target temperature for this range will not drop below 45.0 °C	**P017B Maximum Accumulated Energy -Tertiary** This diagnostic models the net energy into and out of the cooling system during the warm-up process. The ten energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to transmission oil, heat loss to enviroment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and heat loss to autostop.	The diagnostic will abort if the temperature has dropped by after the customer has commanded the engine off	>5.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor Circuit Low (Diesel L6 ATM)	P017C	Circuit Continuity This DTC detects a short to ground in the Cylinder Head Temperature signal circuit or the Cylinder Head Temperature sensor. This is accomplished by monitoring the resitance of the circuit. If the resistance goes out of our expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngMetalHeadTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8:	< X Ohms X is equal to: Temp Sensor 1: 49 Ohms Temp Sensor 2: 48.8 Ohms Temp Sensor 3: 43.2 Ohms Temp Sensor4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 6: 62.3 Ohms Temp Sensor 7: 48.8 Ohms Temp Sensor 8: 62.3 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHe adTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor Circuit High (Diesel L6 ATM)	P017D	Circuit Continuity This DTC detects a short to ground in the Cylinder Head Temperature signal circuit or the Cylinder Head Temperature sensor. This is accomplished by monitoring the resitance of the circuit. If the resistance goes out of our expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5	> X Ohms X is equal to: Temp Sensor 1: 230,546 Ohms Temp Sensor 2: 230,546 Ohms Temp Sensor 3: 338,540 Ohms Temp Sensor4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 6: 380,707 Ohms Temp Sensor 7: 230,546 Ohms Temp Sensor 8: 380,707 Ohms	Diagnostic is Enabled Engine run time OR IAT min	 > 10.0 seconds > -20.0 °C	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor “A” Circuit Intermittent/ Erratic (Diesel L6 ATM)	P017E	Circuit Erratic This DTC detects large step changes in the cylinder head temperature sensor signal circuit or the cylinder head temperature sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt		Diagnostic is Enabled No Active DTC's	 EECR_EMT1_Erratic_TF TKO EECR_EMT1_CktHiLo_F A	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The calculated high and low limits for the next reading use the following calibrations: Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 3.1 seconds -60.0 °C 150.0 °C 2.4 seconds -60.0 °C 150.0 °C 3.6 seconds -60.0 °C 150.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 4.0 seconds -60.0 °C 250.0 °C 3.4 seconds -60.0 °C 150.0 °C 4.0 seconds -60.0 °C 250.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Fuel Temperature Sensor A Performance	P0181	Determine when fuel temperature sensor is not plausible, due to offset or drift.	IF the fuel fired heater has not been active
			{
			The average for the difference in absolute value between temperature measured by the fuel filter sensor and the reference sensor is:
			}
			ELSE
			
			(see
			P0181 Fuel Temperature Sensor Reference
			)
				
				> 30.00 °C
				
				> 30.00 °C
					Engine off time
					
					Time since engine start rotating
					
					No error for Engine Not Running timer
					
					No electrical fault on the fuel filter temperature sensor
					
					No fault on the reference temperature sensor
					
					At least one valid value received from serial communication
					
					(Engine coolant temperature
					
					OR
					
					ECT_OBD_GlobalCoolTmpEnbl
					(refer to "OBD Coolant Enable Criteria" section))
					
					Number of acquired samples for the absolute difference between fuel filter temperature and reference temperature
					
					Fuel Filter Heater turned Off
					
					Sensor Bus Relay
						>28,800.00
						
						<3.00
						
						FTS_FTS_CktFA
						
						FTS_PlausRefSnsrFlt
						
						> -50.00
						
						< 20.00
							20.00 samples
							
							100 ms/sample
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					commanded on No fault on the sensor bus relay No fault in the serial communication	 SBRRlyFA P1103		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature Sensor A Circuit Low	P0182	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	<50 0	Run crank voltage Run crank voltage Engine not cranking FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 5.0 V > 11.0V > 8.00 SBRRlyFA P1103	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature Sensor A Circuit High	P0183	Determine when a short circuit to ground affects fuel temperature sensor.	Fuel temperature sensor output resistance	> 95,000 0	Run crank voltage Run crank voltage Engine not cranking FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 5.0 V > 11.0V > 8.00 SBRRlyFA P1103	10 failures out of 20 samples 100 ms/samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Temperature Sensor A Circuit Intermittent	P0184	Determine when fuel temperature sensor changes quicker than expected, likely due to an intermittent fault.	Fuel temperature	> (1 - a) *156 °C + (Last good sample * a) with a = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 5.0 V > 11.0V > 8.00 FTS_FTS_CktFA SBRRlyFA P1103	10 failures out of 15 samples 100 ms/samples	Type B, 2 Trips
			Fuel temperature	< (1 - a) * -56 °C + (Last good sample * a) with a = e^[- (amount of consecutive bad samples * 0.01)]	Run crank voltage Run crank voltage FTZM Run crank voltage Sensor Bus relay Commanded on No DTC active At least one valid value received from serial communication	> 5.0 V > 11.0V > 8.00 FTS_FTS_CktFA SBRRlyFA P1103	10 failures out of 15 samples 100 ms/samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Fuel Temperature Sensor B Performance	P0186	Determine when a significant offset affects the temperature sensor located in the fuel rail. The faulire criteria is performed comparing the temperature measured by sensor located in the fuel rail and the sensor located in the fuel filter.	IF the fuel fired heater is not used
			{
			The difference in absolute value between temperature measured by the fuel filter sensor and the reference sensor is
			}
			ELSE
				> 30.00
				
				> 40.00
					Run crank voltage
					OR
					Time since engine is rotating
					No error for Engine Not Running timer
					Engine soak time
					No fault on the fuel filter temperature sensor
					At least one valid value received from serial communication
					The diagnostic feedback protocol is providing information about rail temperature
					No fault on the sensor bus relay
					(Engine coolant temperature
					OR
					ECT_OBD_GlobalCoolTmpEnbl
					(refer to "OBD Coolant Enable Criteria" section))
					Status of the fuel fired heater is recognized
						> 5.0 V
						
						< 3.00
						> 28,800.00
						FTS_FTS_Flt
						
						SBRRlyFA
						
						> -40.00 °C
							21.00 failures out of 42.00 samples
							
							6.25 ms/samples
								Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows) a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFDBR_cmp_FPSS_MinPres Variance ; Otherwise, Report status as Pass b] Intrusive test freq limit: 60 sec between intrusive tests that pass, c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate	Sensed fuel pressure change [absolute value, during intrusive test]	>= 30.00 kPa	a) Diagnostic is .. b) Timer Engine Running c1) Fuel Flow Rate Valid c2) Fault bundle FDB_FuelPresSnsrCktFA c3) Reference Voltage Fault Status [DTC P0641] c4) Fault bundle FAB_FuelPmpCktFA c5) Fuel Control Enable Fault Active [DTC P12A6] c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c7) Fuel Pump Speed Fault Active [DTC P129F] c8) CAN Sensor Bus message $0C3 Comm Fault [DTC P165C] c9) CAN Sensor Bus Fuel Pmp Speed Command ARC and Checksum Comm Fault Code [DTC U18A7] c10) Fuel Pump Duty Cycle Fault Active c11) Sensor Configuration [Wired to FTZM?] c12) Sensor Bus Relay On d) Emissions Fuel Level Low [Message $3FB] e) Fuel Control Enable f) Fuel Pump Control State g) Instantaneous Fuel	a) ENABLED b) >= 5.00 seconds c1)== TRUE c2) == False c3) == False c4] == False c5) == False c6) == False c7) == False c8) == False c9] == False c10) == False c11) == CeFDBR_e_WiredTo_FTZM c12) ==TRUE d) == False e) == TRUE f) == Normal Control OR == Fuel Pres Sensor Stuck Control g) >= 0.05 gm/sec	1 sample / 12.5 millisec Intrusive Test Duration: Fuel Flow - related (5 to 12 sec)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Flow h) Diagnostic System Disabled j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [DTC U18A7] j2) CAN Sensor Bus message $0C3_Available j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3][DTC U18A7]	h) == False j1) == False j2) ==TRUE j3) == False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit Low	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *100%]	Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	a) Diagnostic is .. b) Run_Crank Active c) Diagnostic System Disabled d) Pressure Sensor Configuration	a) ENABLED b) == TRUE c) == False d) If calibration value CeFDBR_e_WiredTo_FTZM == WiredTo ECM Else see Case2	64.00 failures / 80.00 samples 1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	< 4.00 % or [0 kPa gauge]	a) Diagnostic is .. b) Run_Crank Active c) Diagnostic System Disabled d1) Pressure Sensor Configuration d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3 Available d4) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3] [Infol]	a) ENABLED b) == TRUE c) == False d1) If calibration value CeFDBR_e_WiredTo_FTZM == WiredTo FTZM Else see Casel d2) == TRUE d3)== TRUE d4) == False	64.00 failures / 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted High Values are analyzed as percent of sensor reference voltage [[Abs [5.0V - SensorVoltsActual] / 5.0V] *100%]	Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	a) Diagnostic is .. b) Run_Crank Active c) Diagnostic System Disabled d) Pressure Sensor Configuration	a) ENABLED b) == TRUE c) == False d) If calibration value CeFDBR_e_WiredTo_FTZM == WiredTo ECM Else see Case2	64.00 failures / 80.00 samples 1 sample/12.5 ms	Type B, 2 Trips
			Fuel Pressure Sensor output % [re. full range as percent of 5.0V reference]	> 96.00 % or [743 kPa ga]	a) Diagnostic is .. b) Run_Crank Active c) Diagnostic System Disabled d1) Pressure Sensor Configuration d2) Sensor Bus Relay On d3) CAN Sensor Bus message $0C3 Available d4) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3][Info1]	a) ENABLED b) == TRUE c) == False d1) If calibration value CeFDBR_e_WiredTo_FTZM == WiredTo FTZM Else See Case 1 d2) == TRUE d3) == TRUE d4) == False	64.00 failures / 80.00 samples 1 sample/12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor A Performance	P0191	Determine when fuel rail pressure sensor is not plausible, due to offset or drift.	Rail pressure sensor output (as percentage of supply voltage) OR Rail pressure sensor output (as percentage of supply voltage)	>12.0% < 8.0%	Engine off time No error for Engine Not Running timer No engine movement detected since begin of driving cycle (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to *"OBD Coolant Enable Criteria"* section)) Run crank voltage Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed No active DTC:	>480s >-40 °C = TRUE > 5.0 V > 11.0V ECT_Sensor_FA FHP_RPS_CktFA	14 failures out of 17 samples 6.25 ms/sample	Type A, 1 Trips
			Absolute difference between rail pressure #1 (first trace) and rail pressure #2 (second trace)	>25.0 MPa	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time	= CeFHPG_e_RPS_DoubleTrack > 15,000s	14 failures out of 17 samples 6.25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR			
					Run crank voltage	> 8.4 V		
					No active DTC:	FHP_RPS_CktFA FHP_RPS2_CktFA P0194		
					The diagnostic feedback protocol is in the state outputting the redundant pressure information			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor A Circuit Low Voltage	P0192	Determine when a short circuit to ground affects fuel rail pressure sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.0 %	(Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed	 > 15,000 s > 8.4 V)	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor A Circuit High Voltage	P0193	Determine when a short circuit to voltage affects fuel rail pressure sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	> 96.0%	(Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed	 > 15,000 s > 8.4 V)	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature (EOT) Circuit Low	P0197	Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Engine Oil Temperature Sensor (EOT) Circuit Resistance	< 25 ohms	Diagnostic Status	Enabled	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature (EOT) Circuit High	P0198	Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Engine Oil Temperature Sensor (EOT) Circuit Resistance	> 450,000 ohms	Diagnostic Status Engine Run Time OR ECT	Enabled > 20.0 seconds >= -20 Deg C	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature Sensor (EOT) Circuit Intermittent	P0199	Determines if an intermittent fault exists on the engine oil temperature sensor circuit. This diagnostic compares each temperature sample to the previous sample and measures cumulative error over a sample period.	**Continuous Test** Pass/Fail Condition: Temperature signal string length, cumulative sum of absolute value of (Oil Temperature - Previous Oil Temperature)	String Length >= 10.00 °C	None	Enabled	4 failures out of 5 samples, sampled every 2 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature Sensor B Circuit Low	P01BB	Controller specific output driver circuit diagnoses the Engine Oil Temperature Sensor B low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Engine Oil Temperature Sensor B Circuit Resistance	< 25 ohms	Diagnostic Status	Enabled	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature Sensor B Circuit High	P01BC	Controller specific output driver circuit diagnoses the Engine Oil Temperature Sensor B low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Engine Oil Temperature Sensor B Circuit Resistance	> 450,000 ohms	Diagnostic Status Engine Run Time OR ECT	Enabled > 20.0 seconds >= -20 Deg C	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature Sensor B Circuit Intermittent	P01BD	Determines if an intermittent fault exists on the engine oil temperature sensor B circuit. This diagnostic compares each temperature sample to the previous sample and measures cumulative error over a sample period.	**Continuous Test** Pass/Fail Condition: Temperature signal string length, cumulative sum of absolute value of (Oil Temperature - Previous Oil Temperature)	String Length >= 10.00 °C	None	Enabled AND EngOilTempFA = FALSE	4 failures out of 5 samples, sampled every 2 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature (Diesel L6 ATM)	P01F0	This DTC detects an unexplained cooling system cool down below the OBD monitoring threshold during normal operating conditions. This check is run throughout the key cycle.	Engine outlet coolant temperature drops below for an unexpected reason	55.0 °C	Diagnostic is Enabled No Active DTC's Engine Runtime Distance traveled this key cycle Ambient air pressure Ambient air temperature ************************** Engine coolant temperature At least once during the key cycle Type 0 (non-heated t-stat) ************************** Heat to coolant DFCO time Thermostat duty cycle RPM Active Fuel Management is not in	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstInaccurate ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA >30.0 seconds >1.2 km > 55.0 kPa >-9.0 °C > 56.9 °C ≥ **P01F0 - Heat To Coolant Min 2D** < 15.0 seconds < 101.0% < 8,192 Half Cylinder Mode	110 seconds out of a 130 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger "A" Overboost Condition	P0234	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent negative control deviation of the boost pressure indicating an overboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the overboost pressure monitor is to detect obstructions in the exhaust pipe. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to an obstruction) that leads to exceed the emission limits.	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) lower than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control active)** [kPa] X **P0234: Overboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): < (**P0234: Negative boost deviation threshold (throttle control not active)** [kPa] X **P0234: Overboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	I.00==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > I I .00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE >-20.00 [°C] AND <55.00 [°C] > -7 [kPa/s] AND < 6 [kPa/s] >2,500.00 [rpm] AND <4,000.00 [rpm]	50 fail counters over 70 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine speed in range			
					Desired intake Boost pressure in range	> **P0234: Minimum boost pressure for overboost monitor enabling** [kPa] AND **P0234: Maximum boost pressure for overboost <monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>60 [°C] ==TRUE <130 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND <110 [kPa]		
					Throttle Valve position	>= 85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		
						AIC_BstSysDiagDenomDsbl		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No active DTCs All enabling conditions last for a time	==FALSE > **P0234: Overboost monitor delay timer** [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Pump Performance	P026E	This DTC indicates a pump flow deviation failure. An expected phase current of the pump is superviced to detect any pump malfunction.	Absolute Pump AC (Phase) current error = (Actual pump speed refer to **PmpPerf: Tabel to estimate the expected pump AC current based on the pump speed,** in Supporting table) - Actual Pump AC current For more than	> 5.00 A > 5.00 sec	Pump H/W present Diagnostic enabled ******************************	True True ******************************	16 failures out of 20 samples 1000ms / sample	Type B, 2 Trips
					Actual pump speed ******************************	> 1,000 rpm ******************************		
					NelCPD_b_IC_PmpMtrCurrFA OR Pump Current OOR Error ******************************	= False ******************************		
					Powertrain relay voltage Or WCP direct connected too Batt	>=11.0 Volts False		
					(Coolant Temp OR OBD Coolant enable Criteria) AND (Coolant Temp OR OBD max Coolant Temp achieved) ******************************	 > 40.00 C =TRUE <= 126.00 C =FALSE ******************************		
					- Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger "A" Underboost Condition	P0299	This monitor detects failures in the charging air system such to not fulfill the request of boost pressure in the intake manifold. It works only in steady state closed loop pressure control zone. The DTC checks a permanent positive control deviation of the boost pressure indicating an underboost condition. This monitor is used to detect any malfunction in the boost pressure system causing the vehicle's emissions to exceed the limits. The aim of the underboost pressure monitor is to detect leakages in the pipe after the compressor or in the intake/exhaust manifold. The boost pressure is usually controlled by the VGT vanes. The intake manifold pressure is also affected by the throttle valve and the HP EGR valve position changes. The aim of this procedure is to identify a limitation of the VGT vanes (equal to a leakage) that leads to exceed the emission	Boost pressure tracking error(difference between the desired boost pressure and the measured pressure at intake manifold by MAP sensor) higher than a threshold. If throttle control is active: The setpoint used for closed loop control is the conversion of the desired upstream throttle boost pressure (target) in desired intake boost pressure. The conversion of the setpoint is done calculating the pressure drop over the throttle valve that is strictly dependent on the valve position. If throttle control is NOT active: The setpoint used for closed loop control is the intake manifold pressure: in this situation the diagnostic monitors the boost pressure closed loop control tracking error.	If throttle control is active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control active)** [kPa] X **P0299: Underboost barometric correction**) If throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form): > (**P0299: Positive boost deviation threshold (throttle control not active)** [kPa] X **P0299: Underboost barometric correction**)	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Difficult launch NOT detected Boost Pressure Control Closed Loop active No active transition from a combustion mode to another one Outside Air Temperature in range Desired Boost Pressure steady state: BstDes-BstDes_Old	**P0234, P0299: Boost pressure control deviation enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "LDT_DifficultLaunchActive" Free Form Refer to "Boost Control in Closed Loop" Free Form ==TRUE >-20.00 [°C] AND <55.00 [°C] > -7 [kPa/s] AND < 6 [kPa/s]	200.00 fail counters over 250.00 sample counters sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		limits.			Engine speed in range	> 1,300.00 [rpm] AND <2,050.00 [rpm]		
					Desired intake Boost pressure in range	> **P0299: Minimum boost pressure for underboost monitor enabling** [kPa] AND < **P0299: Maximum boost pressure for underboost monitor enabling** [kPa]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>60 [°C] ==TRUE <130 [°C]		
					Ambient Air Pressure in range	> 70 [kPa] AND <110 [kPa]		
					Throttle Valve position	>= 85.00 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >= 75.00 [%] if throttle control is NOT active (Refer to "Other AICR DSL flags" Free Form)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No active DTCs	AIC_BstSysDiagDenomDsbl ==FALSE		
					All enabling conditions last for a time	> **P0299: Underboost monitor delay timer** [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise. Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for duration of Trip Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((MedresJDecel Medres_Jerk OR (MedresJDecel Medres_Jerk OR (LoresJDecel Lores_Jerk OR (LoresJDecel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab **> RufSCDJDecel** AND **> RufSCD_Jerk)** **> SCD_Decel** AND **> SCD Jerk)** **> RufCylJDecel** AND **> RufCyl_Jerk)** **> CylModeDecel** AND **> CylModeJerk)** **>RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution "ECT" If OBD Max Coolant Achieved = FALSE -9 °C < ECT Or if OBD Max Coolant Achieved = TRUE -9 °C < ECT < 127 °C < -9 °C If OBD Max Coolant Achieved = FALSE 21 °C < ECT If OBD Max Coolant Achieved = TRUE 21 °C < ECT < 127 °C 9.00 < volts < 32.00 < 100.00 % per 25 ms < 100.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (4) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between engine and transmission can go into extreme resonance. Default action is to move rpm out of the resonance zone. If default action not activated, significant hardware damage could occur rendering vehicle inoperable.	****************************** **This Feature only used on Diesel engines** Combustion Modes that force selection of Idle Tables ****************************** Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables: RANDOM MISFIRE Use random misfire thresholds If no misfire for (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk)	************************** **This Feature only used on Diesel engines** **CombustModeIdleTbl** in Supporting Tables ************************** > 3 Engine Cycles **> RufSCD_Decel * Random_SCD_Decel** **>RufSCD_Jerk * Random_SCD_Jerk** **> SCD_Decel * Random_SCD_Decel** **> SCD_Jerk * Random_SCD_Jerk** **> RufCyl_Decel * RandomCylModDecel** **> RufCyl_Jerk * RandomCylModJerk**			any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Catalyst Failure reported with (1 or 3) Exceedences in FTP, or(1) Exceedence outside FTP. Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR (Lores_Decel AND Lores_Jerk) OR RevBalanceTime PAIRED CYLINDER MISFIRE If a cylinder & it's pair are above PAIR thresholds (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk) OR (Lores_Decel AND Lores_Jerk)	**> CylModeDecel * RandomCylModDecel** **> CylModeJerk * RandomCylModJerk** **> RevMode_Decel * RandomRevModDecl** **> RufSCD_Decel * Pair_SCD_Decel** **> RufSCD_Jerk * Pair_SCD_Jerk** **> SCD_Decel * Pair_SCD_Decel** **>SCD_Jerk * Pair_SCD_Jerk** **> RufCyl_Decel * PairCylModeDecel** **> RufCyl_Jerk * PairCylModeJerk** **> CylModeDecel * PairCylModeDecel** **> CylModeJerk * PairCylModeJerk**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR (Revmode Active AND (within one engine cycle: 2nd largest LoresJDecel) AND Above TRUE for)) BANK MISFIRE Cylinders above Bank Thresholds (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (LoresJDecel AND Lores_Jerk) OR (LoresJDecel AND Lores_Jerk)	**> CylModeDecel * PairCylModeDecel** > 35 engine cycles out of 100 engine cycles >= 2 cylinders **> RufSCD_Decel * Bank_SCD_Decel** **> RufSCD_Jerk * Bank_SCD_Jerk** **> SCD_Decel * Bank_SCD_Decel** **>SCD_Jerk * Bank_SCD_Jerk** **> RufCyl Decel * BankCylModeDecel** **> RufCyl_Jerk * BankCylModeJerk** **> CylModeDecel * BankCylModeDecel** **> CylModeJerk * BankCylModeJerk**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CONSECUTIVE CYLINDER MISFIRE 1st cylinder uses single cyl continuous misfire thresholds; 2nd Cylinder uses: (MedresJDecel AND Medres_Jerk) OR (MedresJDecel AND Medres_Jerk) OR (LoresJDecel AND Lores_Jerk) OR (LoresJDecel AND Lores_Jerk)	**> RufSCDDecel * ConsecSCD_Decel** **> RufSCD_Jerk * ConsecSCDJerk** **> SCD_Decel * ConsecSCD_Decel** **>SCD_Jerk * ConsecSCDJerk** **> RufCyl_Decel * ConsecCylModDecel** **> RufCyl_Jerk * ConsecCylModeJerk** **> CylModeDecel * ConsecCylModDecel** **> CylModeJerk * ConsecCylModeJerk**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CYLINDER DEACTIVATION MODE (Active Fuel Managment)					
			AFM: SINGLE CYLINDER CONTINUOUS MISFIRE (CylAfterDeacCyl_Decel	**> CylModeDecel * ClyAfterAFM_Decel**				
			AND CylAfterDeacCyl_Jerk)	**> CylModeJerk * CylAfterAFMJerk**				
			OR (CylBeforeDeacCylDecel	**> CylModeDecel * CylBeforeAFM_Decel**				
			AND CylBeforeDeacCyl_Jerk)	**> CylModeJerk * ClyBeforeAFMJ erk**				
			AFM: RANDOM MISFIRE Use random misfire thresholds If no misfire for	> 3 Engine Cycles				
			(CylAfterDeacCyl_Decel	**> CylModeDecel * ClyAfterAFM_Decel * RandomAFM_Decl**				
			AND CylAfterDeacCyl_Jerk)	**> CylModeJerk * CylAfterAFMJerk * RandomAFM_Jerk**				
			(CylBeforeDeacCylDecel	**> CylModeDecel * CylBeforeAFMDecel * RandomAFM_Decl**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND CylBeforeDeacCyl_Jerk)	**> CylModeJerk * ClyBeforeAFM_Jerk * RandomAFM_Jerk**				
			OR IF option Crank based IMEP estimate is Enabled and CrankBasedJMEP is	Not Enabled < **Misfire_IMEPT hresh _vs_BinID** (Note: Thresholds uses following tables to pick threshold vs BinID. See supporting tables for more information on how BinID works to select appropriate calibration threshold) **Misfire_IMEP_BinID_ vs_RPM_Load Misfire_IMEP_BinID_ RPM_Axis Misfire_IMEP_BinID_ Load_Axis** - see details on Supporting Tables Tab				
			Misfire Percent Emission Failure Threshold	>3.75% P0300				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Misfire Percent Catalyst Damage When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met. < 0 FTP rpm AND < 0 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 8,192 rpm AND > 200 % load AND < 180 counts on one cylinder		
					Engine Speed	550 < rpm < ((Engine Over Speed Limit) - 400) OR 8,191) Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						CamLctnExhFA CamSensorAnyLctnTFTK 0 AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus		
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnos tic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	# Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	**< ZeroTorqueEngLoad** or **<ZeroTorqueAFM** if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	< 100.0 % (< 100.0 % in AFM) > 318 mph (> 318 mph AFM)	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					NEGATIVE TORQAFM If deactivated cylinders appear to make power, torque is negative:		0 cycle delay	
					DeactivatedCyl_Decel AND	**<DeacCylInversionDecel**		
					DeactivatedCyl_Jerk AND	**<DeacCylInversionJerk**		
					# of Deact Cyls Inverted	> 4 cylinders		
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 97.00 %	7 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	
					Delay if PTO engaged	Not Enabled	4 cycle delay	
					Delay if error in indices of buffered data is detected and delay is enabled	Delay Enabled	3 cycle delay	
					Delay if IMEP calculation	initializing on startup or running resets (expires before rpm enablement)	4 cycle delay	
					*****************************	*****************************	******************	
					This Feature only used on Diesel engines			
					Combustion Mode	**= InfrequentRegen** value	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Driver cranks before Wait to Start lamp extinguishes	in Supporting Tables IF TRUE	**WaitToStart** cycle delay	
					Brake Torque	> 199.99 % Max Torque	4 cycle delay	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring:	**> "Ring Filter"** # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	**> "Number of Normals"** # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal).) Used Off Idle, and while not shifting,			
					TPS	> 200 %		
					Engine Speed	> 1,000 rpm		
					Veh Speed	> 3 mph		
					Auto Transmission	not shifting		
					indivdual candidate deemed abnormal if number of consecutive decelerating			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode	**> Abnormal SCD Mode** **> Abnormal Cyl Mode** **> Abnormal Rev Mode** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles, abnormal candidates/ total candidates	>0.50 ratio	discard 100 engine cycle test	
					MISFIRE CRANKSHAFT PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire (recognized), or some disturbance like rough road (unrecognized). At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present within the 100 engine cycles.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages Pattern Recog Enabled: Pattern Recog Enabled during Cylinder Deac Pattern Recog Enabled consecutive cyl pattrn Engine Speed Veh Speed The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire thresholds in effect at that speed and load. (CylAfter_Accel AND CylAfter_Jerk) Addtionally, the crankhaft is checked again a small	Enabled Not Enabled Enabled 675 < rpm < 6,800 > 0.0 mph > Misfire_ decel * **1st_FireAftrMisfr_Acel** > Misfire_Jerk * **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_ decel * **IstFireAftrMisAcelAFM** > Misfire_Jerk * **1stFireAfterMisJerkAFM**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddtjerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.			
					Num of Cylinders after misfire to start check of crankshaft snap	2 Cylinders		
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire**		
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Ratio of Unrecog/Recog	>0.60	discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					****************************** NON-CRANKSHAFT BASED ROUGH ROAD: Rough Road Source ****************************** IF Rough Road Source = WheelSpeedInECM (Wheel speed noise GRABS = OR Traction = OR Vehicle Stability) = AND No Emission Neutral Default Action DTCs ****************************** IF Rough Road Source = "FromABS" (RoughRoad = OR ABS = OR Traction = OR Vehicle Stability) = AND No Emission Neutral Default Action DTCs ****************************** IF Rough Road Source = "TOSS" TOSS dispersion	****************************** Disabled CeRRDR_e_None ****************************** **> WSSRoughRoadThres** active active active ABS Failed Vehicle Dynamics Control System Status Driven Wheel Rotation Status Non Driven Wheel Rotation Status ****************************** detected active active active ABS Failed Vehicle Dynamics Control System Status ****************************** **>TOSSRoughRoadThres** in supporting tables	******************* ******************* discard 100 engine cycle test ******************* discard 100 engine cycle test ******************* discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No Active DTCs ****************************** Default Action Isolator Resonance Default Action Option ****************************** If Isolator Resonance Option Enabled AND Misfire P030x TFTKO	Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only) ****************************** Not Enabled ****************************** Set engine speed limits: 0 < Eng RPM < 9,000	4 cycle delay ******************* *******************	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position System Variation Not Learned	P0315	This DTC determines if the crankshaft sensor learn values that are stored in memory are valid. The angle between each tooth of the reluctor wheel is learned, and the sum of all angles together should sum to 360° (one revolution of the reluctor wheel). Default values, or corrupted values will not sum to 360°.	The Crankshaft target wheel should be 360 degrees around in circumferance. Loss or controller non-volitile memory or an error in memory will cause the values of individual teeth learn to be defaulted or incorrect. Set the DTC if the Differance between the sum of the reluctor wheel's teeth and 360 degrees is greater than:	> 0.001 degrees	OBD Manufacturer Enable Counter	MEC = 0	0.50 seconds Frequency Continuous100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 0.1 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 2.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 > 65,535	Engine is Running OR Starter is engaged No DTC Active:	P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 2.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	The number of camshaft pulses received during first 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle)	< 4 > 6	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	Type A, 1 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position Sensor - Crankshaft Start Position Incorrect	P034A	Monitors the position of the crankshaft during a hybrid auto-start to verify that the sensor has reported the crankshaft position properly.	Crankshaft position is in error by a number of crankshaft wheel teeth	> 1 crankshaft teeth	Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	CrankSensor_FA	2 failures out of 3 samples a sample occurs each time the engine is started	Type B, 2 Trips
			Crankshaft position is in error by at least one crankshaft wheel tooth		Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	CrankSensor_FA	4 failures out of 5 samples a sample occurs each time the engine is started	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position Sensor - Crankshaft Direction Incorrect	P034B	The Crankshaft Direction Incorrect test monitors the number of crankshaft reversals reported by a bi-directional crank sensor.	Number of crankshaft sensor reversals within a period of time	>= 3 <= 10.0 seconds	Engine Speed Engine Speed Engine Air Flow Engine Movement Detected No Active DTCs:	> 400 RPM < 2,000 RPM >= 2.0 grams/second CrankSensor_FA	Continuous Every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation (EGR) Flow insufficient	P0401	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to lower HP EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the HP EGR flow monitor is to detect HP EGR obstructions (insufficient HP EGR flow). The HP EGR flow depends on several variables like the HP EGR valve position, intake manifold pressure, exhaust pressure, HP EGR cooler (if present) outlet temperature. The aim of this procedure is to identify a limitation of the HP EGR (equal to an obstruction) that leads to exceed the OBD limits.	Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< ((SeaBaro Constant X **P0401: Insufficient HP EGR flow barometric table B (sea level)** [mg]) + (SeaBaro Constant X **P0401: Insufficient HP EGR flow barometric table A (sea level)** [mg] X **P0401: Insufficient HP EGR flow temperature correction (sea level)**)) X **P0401: Barometric Sea Correction** + (	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Desired EGR rate Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis for a minimum number of samples Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis for a minimum number of samples	I.00==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > I I .00 [V] Refer to "Air Control Active" Free Form > 0 [%] TRUE if <= 13 [rpm], FALSE if > 16.00 [rpm] >20 [counts] TRUE if <=0.20 [mm^3], FALSE if > 0.50 [mm^3] >25 [counts] Refer to "Air Control TransitionTree Form	400.00 fail counters over 500.00 sample counters sampling time is 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				MidBaro Constant X **P0401: Insufficient HP EGR flow barometric table B (mid level)** [mg]) + (MidBaro Constant **P0401: Insufficient HP EGR flow barometric table A** **x(mid level)** [mg] X **P0401: Insufficient HP EGR flow temperature correction (mid level)**) + (LoBaro Constant X **P0401: Insufficient HP EGR flow barometric table B (low level)** [mg]) + (LoBaro Constant X	An air control transition has ended OR Such condition is disabled by calibration No active transition from a combustion mode to another one Throttle measured position Outside Air Temperature Ambient Pressure Engine Coolant Temperature OR OBD Coolant Enable Criteria Desired HP EGR flow Desired fuel quantity	OR 1.00==TRUE ==TRUE > 85.00 [%] > -20.00 [°C] > 69.60 [kPa] > 60.00 [°C] ==TRUE > **P0401: Minimum desired HP EGR flow** [mg] > **P0401: Insufficient HP EGR flow Min fuel enabling condition** [mm^3] AND <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P0401: Insufficient HP EGR flow barometric table A (low level) [mg] X **P0401: Insufficient HP EGR flow temperature correction (low level)**)	Outside air temperature in range	**P0401: Insufficient HP EGR flow Max fuel enabling condition** [mm^3] Condition must be TRUE. Refer to "P0401, P131F, P049B: Outside air temperature" Free Form		
				+	Desired LP EGR split	== 0%		
				(MinBaro Constant X **P0401: Insufficient HP EGR flow barometric table B (min level)** [mg])	LP EGR valve measured position	< 1.00 [%]		
				+ (MinBaro Constant X **P0401: Insufficient HP EGR flow barometric table A (min level)** [mg] X **P0401: Insufficient HP EGR flow temperature correction (min level)**)	All enabling conditions last for a time	>=0.70 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Range/ Performance	P041B	Determines the EGR temperature Sensor 1 has not moved enough since start after an allowed amount of EGR flow consumed by engine following a long enough soak.	After an allowed amount of EGR flow consumed by engine following a long enough soak, the Up Stream Temperature sensor has not change enough.	Absolute error between current temperature and Initial temperature <= **UP Stream Stk Temp Vrtn**	Diagnostic is System supply voltage Engine soak (not run) time No Active DTCs Engine is running	Enabled > 11.00 Volts >= 28,800.00 Sec P262B Active	cumulative EGR Flow> 3,000.00 g 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Low	P041C	Diagnose the EGR Up Stream Temperature sensor circuit low by measuring the resistance of the sensor circuit. If the measured resistance of the circuit is below the allowed operating range, the sensor is out of range low.	The ECM detects that the measured resistance of the temperature sensor is out of range low.	Measured Resistance of the Temperature sensor < 10.00 Q impedance	Diagnostic is System supply voltage Output driver is commanded on Ignition switch is in crank or run position	Enabled > 11.00 Volts	30 failures out of 38 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt High	P041D	Diagnose the EGR Up Stream Temperature sensor circuit high by measuring the resistance of the sensor circuit. If the measured resistance of the circuit is above the allowed operating range, the sensor is out of range high.	The ECM detects that the measured resistance of the temperature sensor is out of range high.	Measured Resistance of the Temperature sensor > 20,000,000.00 0 impedance	Diagnostic is System supply voltage Output driver is commanded on Ignition switch is in crank or run position	Enabled > 11.00 Volts	30 failures out of 38 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori Ckt Intermittent/ Erratic	P041E	Detects a temperature sensor that is showing erratic or intermittent temperature readings. The temperature feedback is monitored in a 100 ms time loop. If the temperature is changing more than an allowed amount per loop the sensor is determined to be erratic.	The absolute value of the loop to loop (100 ms / sample) resistance change of the temperature sensor is greater than the allowed rate of change.	Delta chage > 25.00 Q impedance	Diagnostic is System supply voltage Output driver Ignition switch	Enabled > 11.00 Volts On Crank or Run	60 failures out of 75 samples 100 ms /sample, continuous	Type B, 2 Trips

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Warm Up Catalyst Efficiency Below Threshold Bank 1	P0421	Cold start based monitor: the Catalyst (CC DOC) monitor only runs at cold start when dedicated conditions to detect this situation are satisfied. The diagnostic takes advantage of the HydroCarbon stored in the cold phase (the proper combination of combustion mode and injection pattern is requested in order to accumulate the proper amount of HC for performing a robust monitoring) and evaluates the energy produced by Catalyst during the following oxidation process (once that light-off temperature is fulfilled). The so calculated released energy is compared to the energy provided at CC DOC inlet in order to rescale the efficiency index value. Some corrections to minimize the results dispersion are finally applied. EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA	Catalyst Efficiency Index < Threshold If - Catalyst EWMA filter enabling calibration = TRUE AND - Catalyst conversion inefficiency previously detected (Catalyst Fault Active = TRUE) Then: Catalyst Efficiency Index < Repass Threshold	Efficiency Index < **CatCrtdEffThrsh** [Curve] If EWMA Enbl Cal = 1.00 [Boolean] AND Catalyst FA = CAT_CatSysEffl_oB1_FA Then: Efficiency Index < **CatCrtdEffRepEWMA** [Curve]	**Catalyst monitor is enabled if:** - Catalyst monitor enabling calibrations = TRUE AND Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (DOC de-greened); AND - No active DTCs: Catalyst up temperature sensor not in fault (Fault Flag = FALSE) AND Catalyst down temperature sensor not in fault (Fault Flag = FALSE) AND Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND Injection system not in fault (Fault Flag = FALSE) AND Ambient temperature information not in fault (Fault Active = FALSE) AND	**Catalyst monitor is enabled if:** Cat Monitor Enbl Cal = 1.00 [Boolean] AND ColdStartMonitorSelected = 1.00 [Boolean] AND DPF Rgn Cmpt >= 1.00 AND No active DTCs [Boolean]: Cat Up Temp Snsr Flt = NOT (EGT_SnsrCatUpFlt) AND Cat Dwn Temp Snsr Flt = NOT (EGT_SnsrCatDwnFlt) AND Cat Up Exh Flow Flt = NOT (EXFJotExhCatUpFlt) AND Injection System Flt = NOT (FUL_GenericlnjSysFlt) AND Amb Temp FA = NOT (OAT_PtEstFiltFA) AND Veh Speed FA = NOT (VehicleSpeedSensor FA)	Task Time = 100 [ms] If - Catalyst EWMA filter enabling cailibration = FALSE (EWMA Enbl Cal = 1.00 [Boolean]) Then: 2 trips (with malfunction) to set DTC (Type B) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = EWMA Standard Then: 1 trip (with malfunction) to set DTC (Type A) If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean])	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Standard) is supported by the Catalyst (CC DOC) monitor.			Vehicle speed information not in fault (Fault Active = FALSE) AND Catalyst down hydrocarbon estimation not in fault (Fault Flag = FALSE) AND Soaking time information not in fault (Fault Active = FALSE) AND Engine coolant temperature information not in fault (Fault Flag = FALSE) AND IF water desorption model compensation is enabled THEN specific humidity model not in fault AND -Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Cold start conditions detected at key on: Engine coolant temperature lower or	AND Cat Dwn HC Flt = NOT (CAT_HC_CatDwnFlt) AND Eng Mode Not Run Timer = NOT (EngineModeNotRunTimer_FA) AND Eng Cool Temp Flt = NOT (ECT_Sensor_FA & ECT_Sensor_TFTKO) AND IF water desorption model compensation enabled (1.00 [Boolean]) THEN WetExhSpcfcHumNotVld = NOT (EXM_WetExhSpcfcHumNotVld) AND Ambient conditions always satisfied while engine running [Boolean]: Amb Press > 74.36 [KPa] AND Amb Temp > 253.00 [K] AND	AND - EWMA status = Fast Initial Response (FIR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) AND - EWMA status = Rapid Response (RR) Then: - 1 trip (with malfunction) to set DTC (Type A) and return to EWMA status = EWMA Standard - 1 trip (with no mulfunction) to report pass	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					equal than calibration AND Catalyst down exhaust temperature (by sensor) lower or equal than calibration AND Soaking time higher or equal than calibration AND Catalyst stored HydroCarbon quantity lower or equal than calibration AND Late after injection quantity lower or equal to the difference between the quantity disabling the after injection request in case of long idle and the minimum quantity aborting the monitor AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle): Catalyst down estimated temperature (by 1dk thermal model) lower than calibration AND monitor not completed in freezing state	Cold start conditions detected at key on [Boolean]: Eng Cool Temp <= 55.00 [°C] AND Cat Dwn Temp Snsr <= 55.00 [°C] AND Soak Time >= 0.00 [s] AND Cat Stored HC <= 0.70 [g] AND Late after injection quantity lower or equal to the difference between 30,000.00 and 5,000.00 AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean]: Cat Dwn Temp (by 1dk thermal model) < 280.00 [°C] AND	- 2.00 [Counter] elapsed trips (with no mulfunction) to report pass and return to EWMA status = EWMA Standard	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND - If enabled by cal, HC accumulation strategy never disabled **Catalyst monitor integration is enabled if:** - Catalyst up exhaust temperature (read by sensor) higher than calibration If Catalyst up exhaust temperature (read by sensor) lower than calibration, integration is reset - Catalyst down exhaust temperature (read by sensor) higher than calibration If catalyst down exhaust temperature (read by sensor) lower than calibration, integration is reset **Catalsyt monitor integration is frozen if:** - Catalyst up exhaust flow lower than calibration If Catalyst up exhaust flow higher than calibration integration is re-enabled; - Current combustion mode is not suitable for	when Cat Dwn Temp (by 1dk thermal model) = 280.00 [°C] catalyst monitor integration is not frozen AND if HC accumulation strategy enable cal == TRUE (cal value = 1.00 [Boolean]) then AIC_CoolByp_DsblLateAf t == FALSE **Catalyst monitor integration is enabled if:** Cat Up Temp Snsr > 210.00 [°C] If Cat Up Temp Snsr < 145.00 [°C] integration is reset Cat down Temp Snsr > 150.00 [°C] Cat down Temp Snsr < 125.00 [°C] integration is reset **Catalsyt monitor integration is frozen if:** Cat Up Exh Flow < 39.00 [g/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					monitor - engine is not running **Diagnostic test evaluation is triggered if:** - Catalyst down estimated temperature (by 1dk thermal model) higher or equal than calibration. **Diagnostic test evaluation is aborted if:** - the ratio between time spent in a not suitable combustion mode and the whole monitoring time exceeds a threshold - the ratio between time spent in low flow condition and the whole monitoring time exceeds a threshold - the combination of the two ratios above exceeds a threshold - the ratio between time spent in a not suitable combustion mode and the time frame once enabling conditions are met but the monitor is not running exceeds a threshold - the integration time (monitoring time) is lower than a threshold - the integration time (monitoring time) is higher than a threshold	If Cat Up Exh Flow > 44.00 [g/s] integration is re-enabled; 0.00, 0.00, 1.00 OR 0.00 = FALSE engine not running **Diagnostic test evaluation is triggered if:** Cat Dwn Temp (by 1dk thermal model) >= 280.00 [°C], **Diagnostic test evaluation is aborted if:** - combustion mode ratio > 0.20 - flow ratio > 0.70 - combined ratio > 0.70 - combustion mode preparation ratio > 0.27 - integration time < 29.00 [s] - integration time >		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					- Injected HC quantity in cold start phase lower than a threshold	150.00 [s] - Injected HC < 5,000.00 [mg]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Performance (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	a) Sensed fuel volume change is b) while engine fuel consumption is	a) < 3 liters b) > 24.00 liters	1. Diagnostic Enabled 2. Engine Operational State	1. == True 2. == Running	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit Low Voltage (For use on vehicles with a fuel float connected to an FTZM)	P0462	This DTC will detect a primary fuel tank sensor out-of-range low.	Fuel level Sender % of 5V range	< 10%	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True b) == True c) == True d) <> True	100 failures out of 125 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit High Voltage (For use on vehicles with a fuel float connected to an FTZM)	P0463	This DTC will detect a primary fuel tank level sensor out-of-range high.	Fuel level Sender % of 5V range	> 60 %	a) Diagnostic enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) == True b) == True c) == True d) <> True	100 failures out of 125 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan Speed Low [LIN Bus Electric PWM Fans Only - Internal or External controller]	P0494	Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling. Only after first fan activation, the fan will be held commanded on for enough time to ensure this monitor has an opportunity to mature a decision.	Measured Fan Speed	<= Speed Low Limit [Supporting Table] **P0494_LIN_Threshold**	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus Continuous Operation Fault Active h] Fan Commanded On	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <> True h] ==TRUE	16.00 failures / 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Flow Insufficient	P049B	This monitor detects failures in the air system such to not fulfill the request of mass air flow through the intake circuit. This monitor is used to detect any malfunction in the air system that leads to lower LP EGR rate causing the vehicle's emissions to exceed the OBD limits. The aim of the LP EGR flow monitor is to detect LP EGR obstructions (insufficient LP EGR flow). The LP EGR flow depends on several variables like the LP EGR valve position, intake manifold pressure, exhaust pressure, LP EGR differential pressure, LP EGR cooler outlet temperature. The aim of this procedure is to identify a limitation of the LP EGR (equal to an obstruction) that leads to exceed the OBD limits.	Air mass tracking error: difference between the fresh air requested (set point) and the fresh air measured by MAF sensor.	< ((SeaBaro Constant X **P049B: Insufficient LP EGR flow barometric table B (sea level)** [mg]) + (SeaBaro Constant X **P049B: Insufficient LP EGR flow barometric table A (sea level)** [mg] X **P049B: Insufficient LP EGR flow temperature correction (sea level)**)) X **P049B: Barometric Sea Correction** + (MidBaro Constant X	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Desired EGR rate Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis for a minimum number of samples Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis for a minimum number of samples	**P049B: Insufficient LP EGR flow monitor enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0 [%] TRUE if <= 3.00 [rpm], FALSE if > 10.00 [rpm] > 25.00 [counts] TRUE if <= 0.20 [mm^3], FALSE if > 0.60 [mm^3] > 22.00 [counts]	300.00 fail counters over 375.00 sample counters sampling time is 25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P049B: Insufficient LP EGR flow barometric table B (mid level) [mg]) + (MidBaro Constant X **P049B: Insufficient LP EGR flow barometric table A (mid level)** [mg] X **P049B: Insufficient LP EGR flow temperature correction (mid level)**) + (LoBaro Constant X **P049B: Insufficient LP EGR flow barometric table B (low level)** [mg]) + (LoBaro Constant X	An air control transition has ended OR Such condition is disabled by calibration No active transition from a combustion mode to another one Outside Air Temperature Ambient Pressure Engine Coolant Temperature OR OBD Coolant Enable Criteria Desired LP EGR flow Desired fuel quantity	Refer to "Air Control TransitionTree Form OR 0.00==TRUE ==TRUE > -20.00 [°C] > 69.60 [kPa] > 60.00 [°C] ==TRUE > **P049B: Minimum desired LP EGR flow** [mg] > **P049B: Insufficient LP EGR flow Min fuel enabling condition** [mm^3] AND < **P049B: Insufficient LP EGR flow Max fuel enabling condition**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P049B: Insufficient LP EGR flow barometric table A (low level) [mg] X **P049B: Insufficient LP EGR flow temperature correction (low level)**) + (MinBaro Constant X **P049B: Insufficient LP EGR flow barometric table B (min level)** [mg]) + (MinBaro Constant X **P049B: Insufficient LP EGR flow barometric table A (min level)** [mg] X **P049B: Insufficient LP EGR flow temperature correction (min level)**)		[mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P131F, P049B: Outside air temperature" Free Form		
					Desired LP EGR split	== 100%		
					HP EGR valve measured position	<2.00 [%]		
					All enabling conditions last for a time	>= 1.10 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankcase Ventilation System Disconnected	P04DB	The Crankcase Ventilation System Disconnected Diagnostic monitors the performance of the Positive Crankcase Ventilation (PCV) System. After the enable conditions are met, this monitor will will evaluate the signal of the Crankcase Ventilation Pressure sensor. This sensor is mounted in the PCV hose between the crankcase and the engine induction system. During normal operation, the sensor will see a pressure drop that varies in conjunction with the engine airflow. Additionally, the sensor will see pressure pulses as the cylinders go up and down in the crankcase. This monitor evaluates both the signal offset based on the pressure drop, and the signal noise based on the pressure pulses. The product of the	ScaledSignalLo * ScaledNoiseLo or ScaledSignalHi * ScaledNoiseHi Where ScaledSignalLo = Where ScaledNoiseLo = Where ScaledSignalHi =	< 0.70 kPa * kPa > 15.00 kPa * kPa Average Crankcase Ventilation Pressure Signal value calculated over the sample period and normalized as a function of engine air flow based on table **P04DB: Crankcase Pressure Signal Normalization for Air Flow, low case** 0.50 kPa is subtracted from the normalized value. The absolute value of the result is taken to get the final ScaledSignalLo. Average Crankcase Ventilation Pressure Signal delta calculated over the sample period and normalized as a function of engine speed based on table **P04DB: Crankcase Pressure Noise Normalization for Engine Speed, low case** Average Crankcase Ventilation Pressure	Diagnostic is Enabled Outside Air Temperature Engine Coolant Temperature Barometric Pressure Stability conditions: Engine Air Flow Engine Air Flow Engine Vacuum Engine Vacuum Engine Speed Engine Speed Maximum Engine Air Flow - Minimum Engine Air Flow over the sample period Time that stability conditions must be met prior to sampling data Data is sampled over a period of time Stability conditions must continue to be met as the data sample is collected. A data sample may accumulate data from multiple sample windows. DTCs Active:	>= -20.0 Degrees C >= 70.0 Degrees C >= 68.0 kPa >= 120.0 Grams/Second <= 250.0 Grams/Second >= -220.0 kPa <= -100.0 kPa >= 1,000 RPM <= 4,500 RPM <= 75.0 Grams/Second = 2.3 Seconds = 5.0 Seconds MAF_SensorFA MAP_SensorFA OAT_PtEstFiltFA AmbPresDfltdStatus ECT_Sensor_FA PCV_Sensor_FA	The DTC will fail immediately if the malfunction criteria are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		signal offset and signal noise is compared to a calibration threshold during certain engine operating conditions. If this product is between two failure thresholds, the system is operating as expected, and the monitor passes. If the product is outside of the two failure thresholds, the system is disconnected, and the monitor fails.	Where ScaledNoiseHi = The Crankcase Ventilation Pressure Sensor is sampled every 3.125 msec to calculate ScaledSignalLo/Hi and ScaledNoiseLo/Hi. ScaledSignalLo/Hi and ScaledNoiseLo/Hi values are accumulated over a period of 5.0 Seconds.	Signal value calculated over the sample period and normalized as a function of engine air flow based on table **P04DB: Crankcase Pressure Signal Normalization for Air Flow, high case** 0.50 kPa is subtracted from the normalized value. The absolute value of the result is taken to get the final ScaledSignalHi. Average Crankcase Ventilation Pressure Signal delta calculated over the sample period and normalized as a function of engine speed based on table **P04DB: Crankcase Pressure Noise Normalization for Engine Speed, high case**	DTCs Pending:	PCV_Sensor_Circuit_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankcase Ventilation Hose Connection Sensor Circuit Low	P04E2	Detects a continuous open or short to ground in the Crankcase Ventilation Pressure signal circuit by monitoring the Crankcase Ventilation Pressure sensor output voltage and failing the diagnostic when the Crankcase Ventilation Pressure voltage is too low. The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.	Crankcase Ventilation Pressure Voltage	<= 4.3 % of 5 Volt Range (This is equal to -5.71 kPa)	Diagnostic is Enabled		1,280 failures out of 1,600 samples 1 sample every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankcase Ventilation Hose Connection Sensor Circuit High	P04E3	Detects a continuous short to power in the Crankcase Ventilation Pressure signal circuit by monitoring the Crankcase Ventilation Pressure sensor output voltage and failing the diagnostic when the Crankcase Ventilation Pressure voltage is too high. The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.	Crankcase Ventilation Pressure Voltage	>= 95.5 % of 5 Volt Range (This is equal to 5.69 kPa)	Diagnostic is Enabled		1,280 failures out of 1,600 samples 1 sample every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankcase Ventilation Hose Connection Sensor Range/ Performance	P04FB	Detects a performance failure in the Crankcase Ventilation Pressure sensor, such as when the sensor value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure in the crankcase ventilation system will equalize to atmospheric pressure. The Crankcase Ventilation Pressure sensor value is checked to see if it is within the normal expected range around the expected value of 0 kPa. If it is not, the Crankcase Ventilation Pressure performance diagnostic will fail. The Crankcase Ventilation Pressure sensor is a pressure transducer which outputs a voltage proportional to the gauge pressure between the crankcase ventilation hose and the atmosphere.	Crankcase Ventilation Pressure OR Crankcase Ventilation Pressure	>= 0.63 kPa <= -0.63 kPa	Diagnostic is Enabled Engine is not rotating Time since engine has stopped rotating Engine Coolant Temperature <u>DTCs Active:</u>	 >= 10.0 seconds >= 70.0 deg C PCV_Sensor_Circuit_FA ECT_Sensor_FA EngineModeNotRunTimer Error	128 failures out of 160 samples 1 sample every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 75.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00175	Coolant Temp	> 60 °C	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
						> 30 sec		
						32 > volts > 11		
						> 3 sec		
						> 3 sec		
					Engine run time			
					Ignition voltage	> -20 °C		
					Time since gear change	< 1.2 mph		
						< 25 rpm		
					Time since a TCC mode change	> 5 sec		
					IAT			
					Vehicle speed	> 12.00 pct		
					Commanded RPM delta	< 75.00 pct		
					Idle time			
						PTC not active		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	Transfer Case not in 4WD LowState		
						Off-vehicle device control		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						(service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic Clutch Sensor FA AmbPresDfltdStatus P2771		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All of the above met for Idle time	> 5 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -150.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00175	Coolant Temp	> 60 °C	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	> 30 sec		
					Ignition voltage	32 > volts > 11		
					Time since gear change	> 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	< 1.2 mph		
					Commanded RPM delta	< 25 rpm		
					For manual transmissions: Clutch Pedal Position	> 12.00 pct		
					or Clutch Pedal Position	< 75.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771		
						> 5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All of the above met for Idle time	The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Performance - Continuously Variable Displacement Oil Pump	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure is compared against thresholds when engine is running and when engine is off.The engine oil pressure rationality diagnostic has two parts: engine running test and engine off test. The engine running test compares the measured oil pressure to threshold. If the measured oil pressure is out of the thresholds, then the error counter increments. The engine off test compares the measured oil pressure against thresholds after the engine has stopped rotating. If the measured oil pressure is out of the thresholds, then the error counter increments.	**Two Stage Oil Pump EOP Sensor Test with Engine Running, High Pressure State** <u>To Fail when previously passing with the engine running:</u> Filtered Engine Oil Pressure below threshold OR Filtered Engine Oil Pressure above threshold <u>To pass when previously failing:</u> Filtered Engine Oil Pressure above low threshold plus an offset OR Filtered Engine Oil Pressure below high threshold minus an offset	Filtered Oil Pressure < (**P0521_CVDOP_MinOilPresFail** kPa) OR Filtered Oil Pressure > (**P0521_CVDOP_MaxOilPressure** kPa) Filtered Oil Pressure > (**P0521_CVDOP_MinOilPresFail** + 10.0 kPa) OR Filtered Oil Pressure < (**P0521_CVDOP_MaxOilPressure** - 10.0 kPa)	Variable Displacement Oil Pump is Present = TRUE Engine Running Diagnostic Status Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than **TimeForOilAeration** seconds) Filtered Engine Speed within range Sensed Oil Temperature within range Engine Speed stable No active DTC's	Enabled Enabled Test not report a fail state Yes >10.0 seconds >70.0 kPa FALSE 1,000 RPM < Filtered Engine Speed < 4,500 RPM 40.0 deg C < Sensed Oil Temperature <120.0 deg C (RPM - Previous RPM) < 35 Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	> 40 errors out of 50 samples. Performed every 100 msec > 10 passes out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Two Stage Oil Pump EOP Sensor Test with Engine Off If enabled: To Fail when previously passing with the engine off: Difference between oil pressure and Barometric pressure is Greater than a threshold OR Less than a threshold	(Oil Pressure - Barometric Pressure) >-30.0 kPa OR <30.0 kPa	Two Stage Oil Pump is Present = TRUE Engine Off Rationality Test Diagnostic Status Engine Running Rationality Test Diagnostic Status Modelled Oil Temperature No Engine Movement No active DTC's	Enabled Enabled Test not report a fail state > 60.0 deg C > 10.0 seconds EngineModeNotRunTimer_FA EngOilTempFA EngOilPressureSensorCktFA CrankSensor_FA	> 20 errors out of 40 samples. Run once per trip	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) * 5 Volts) *100	< 6.00 percent Deadband: < 5 percent or > 95 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic Status	> 400 rpm < 350 rpm Yes Enabled	1,280 failures out of 1,600 samples Performed every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) * 5 Volts) *100	> 95.00 percent Deadband: < 5 percent or > 95 percent	Oil Pressure Sensor In Use Diagnostic Status	Yes Enabled	1,280 failures out of 1,600 samples Performed every 3.125 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit Low Voltage	P0532	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too low	(AC High Side Pressure Sensor Circuit Voltage) + 5 Volts) *100	< 3 percent	AC HSP Sensor Present Diagnostic Status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit High Voltage	P0533	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too high	(AC High Side Pressure Sensor Circuit Voltage) + 5 Volts) *100	> 95 percent	AC HSP Sensor Present Diagnostic Status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Voltage Low	P0562	Detects a low 12V battery system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value.	System voltage low	Battery voltage <= 9.00	System voltage low diag enable = TRUE Run Crank voltage Engine speed >=	1.00 Voltage >5.00 volts 400.00	400 failures out of 500 samples 12.5 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Voltage High	P0563	Detects a high 12V battery system. This diagnostic reports the DTC when battery voltage is high.	System voltage high	Battery voltage >= 18.00	System voltage high diag enable = TRUE Run Crank voltage	1.00 Voltage >5.00 volts	400 failures out of 500 samples 12.5 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range. "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in an invalid range, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585-0.615 0.78-0.81, 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control On Switch Circuit	P0565	Detects a failure of the cruise on/off switch in a continously applied state "Emissions Neutral Default Action - When the BCM tells the ECM that the cruise control analog input voltage is in the Momentary Cruise On/Off range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control On switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Resume range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Resume switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Set range for too long, the code is set and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Set switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Cancel Switch Circuit	P056C	Detects a failure of the cruise cancel switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Cancel range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Cancel switch remains applied for greater than a calibratable period of time.	fail continously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Range/ Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	.Brake pedal position sensor movement diagnostic cal is enabled 1.00	True	Diagnostic is enabled. Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00 ignition voltage > 10.00		MIL: Type A, 1 Trips
			Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 3.25 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 8.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table **P057B KtBRKI_K_CmpltTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 8.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Low	P057C	detects short to ground for brake pedal position sensor	If x of y samples are observed below failure threshold, default brake pedal position to zero percent.	5.00	Diagnostic is enabled. Brake Pedal Position Sensore Low Voltage Diagnostic Enable	1.00	20 / 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit High	P057D	detects open circuit for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	95.00	Diagnostic is enabled. Brake Pedal Position Sensore High Voltage Diagnostic Enable	1.00	20.00/ 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic ouput for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	25.00	Diagnostic is enabled. Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	5.00/ 20.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit voltage is too low for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control analog circuit voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "open short to ground when the ratio is measured in the following rangs: 0-0.185	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-function Circuit High Voltage	P0581	detects short to power failure for cruise multi-function switch circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit voltage is too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control analog circuit voltage must be in "Short To Power" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit	P0589	Detect when cruise control multi-function switch circuit B (analog) voltage is in an illegal range "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit is detected Out of Range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585-0.615, 0.78-0.81, 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit Low	P0592	detects short to ground failure for cruise multi-function switch circuit B. "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit is detected too low for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control Circuit B analog voltage A/D count ratio is considered to be "open short to groun"d when the ratio is measured in the following rangs: 0-0.185	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS ,"Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit High	P0593	detects short to power failure for cruise multi-function switch circuit B "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit is detected too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be in a "Short To Power" range for greater than a calibratable period of time.	The cruise control Circuit B analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	A 2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. A Part 1 failure result then enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position.	Smart Shutter Actuator 1 Position Response AND Shutter 1 Diagnostic Delay Threshold count	<> Smart Shutter Actuator 1 Commanded Position percent AND Counter > 109.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutterl Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1.00 failures out of 1.00 samples 1 sample / 100 milliseconds	Type B, 2 Trips
			Shutter 1 Performance Test count	= 5.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutterl Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Active Grill Air Shutter B Performance /Stuck OFF	P05AE	A 2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. A Part 1 failure result then enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position.	Smart Shutter Actuator 2 Position Response AND Shutter 2 Diagnostic Delay Threshold count	<> Smart Shutter Actuator 2 Commanded Position percent AND Counter > 109.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter2 Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1.00 failures out of 1.00 samples 1 sample / 100 milliseconds	Type B, 2 Trips
			Shutter 2 Performance Test count	= 5.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter2 Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
				In all cases, the failure count is cleared when controller shuts down				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Not Programmed	P0602	This DTC will be stored if the ECU is a service part that has not been programmed.	Service (reflash) controller calibration present	= 1		none	Diagnostic runs at powerup and once per second continuously after that	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM Long Term Memory Reset	P0603	This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Type A, 1 Trips
			Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.47144 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Time new seed not received exceeded			always running	0.450 seconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	3 / 18 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test is Enabled: 1 (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	3.00		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is Enabled: 1 (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization.	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Counter >=					
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 0 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		Test is Enabled: 1 (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: **P0606_Last Seed Timeout f (Loop Time)**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Performance	P0607	Indicates that the ECM has detected an internal processor integrity performance.	Performs the failure diagnostic for the offline and online BIST results.			Test is enabled: 0. (If 0, this test is disabled)	5 counts background task/ count in the ECM main processor	Type A, 1 Trips
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is enabled: 1. (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is enabled: 1. (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ANDRADC Fault	P060B	Indicates that the ECM has detected an ANDR ADC Fault.	Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	Type A, 1 Trips
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation percent >	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or 1.75 seconds continuous; 250 ms/count in the ECM main processor	
			Resistance deviation	6.00 %	Run/Crank Voltage >	7.00 V	2 / 14 counts or	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			percent >				1.75 seconds continuous; 250 ms/count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Redundant Memory Performance (Diesel)	P060C	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 175 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 2,000.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 2,000.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10/40 counts; 25.0msec/count	
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run orcrank	Up/down timer 459 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run orcrank	Up/down timer 459 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo	Ignition State	Accessory, run orcrank	255/6 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run orcrank	Up/down timer 475 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							0.5 down time multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Minimum value **P060C_Speed Control External Load f(Oil Temp, (RPM)** , **P060C_Speed Control External Load Max f(Vehicle Speed, RPM) + P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 83.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	82.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 159 ms continuous, 0.5 down time multipier	
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	83.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Request is greater	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			than its redundant calculation plus threshold				ms continuous, down time multipier0.5	
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4,096.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	83.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 159 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 159 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Minimum value **P060C_Speed Control External Load f(Oil Temp, (RPM)** , **P060C_Speed Control External Load Max f(Vehicle Speed, RPM) + P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 83.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Minimum value (**P060C_Speed Control External Load f(Oil Temp, RPM)** , **P060C_Speed Control External Load Max f(Vehicle Speed, RPM) +**	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)) + 83.00 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	2,000.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Driver Immediate Request is less than its redundant calculation minus threshold	2,000.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold OR Commanded Immediate Request is less than its redundant calculation minus threshold	2,000.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate	N/A	Ignition State	Accessory, run orcrank	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Response Type is set to Inactive				475 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	90.00 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Desired engine torque request greater than redundant calculation plus threshold	82.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	550.50 m/s	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 159 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run orcrank	Up/down timer 245 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 83.00 Nm Low Threshold -83.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 463 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 35.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 463 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 83.00 Nm Low Threshold	Ignition State	Accessory, run orcrank	Up/down timer 245 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				0.00 Nm				
			1. Difference of reserve torque value and its redundant calculation exceed threshold OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold	1.82.00 Nm 2. N/A 3.82.00 Nm 4.82.00 Nm	3. &4.: Ignition State	1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 83.00 Nm 3. &4.: Accessory, run orcrank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 175 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	2,000.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM, Vehicle Speed). See supporting tables: min **P060C_Speed Control External Load f(Oil Temp, (RPM)** , Sum **P060C_Speed Control External (b?Bgc ?friCO/ehicle .**	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)) + 83.00 Nm				
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	90.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions	1. 3.50 % 2.	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			and its redundant calculation is out of bounds given by threshold range OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal	N/A 3. N/A			multipier	
			Commanded axle torque is greater than its redundant calculation by threshold	2,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded axle torque is less than its redundant calculation by threshold	3,000.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software	40.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	16/32 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run orcrank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Calculated or Commanded Engine to Axle ratio is lower than a threshold -OR- Engine to Axle Offset is greater than a threshold	0.9 4,096.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 175.00 ms continuous, 0.5 down time multipier	
			Difference between Cruise Arbitration Request and its redundant calcultion exceeds a threshold -OR- Difference between Cruise Accleration Request and its redundant calcultion exceeds a threshold	75.00 Nm 0.05 KPH/Second	Ignition State	Accessory, run orcrank	Up/down timer 500.00 ms continuous, 0.5 down time multipier	
			Difference between commanded Engine Torque and its redundant calcultion is greater than a threshold -OR- Difference between	4,096.00 Nm 3,000.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 2,047.97 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			commanded Engine Torque and its redundant calcultion is less than a threshold					
			Requested fuel mass is greater or equal to its redundant calculation plus threshold	8.44 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			Engine friction torque is greater than its redundant calculation plus threshold OR Engine friction torque is lower than its redundant calculation minus threshold	83.00 Nm 83.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			High Pressure Pump Torque Load is greater than threshold OR High Pressure Pump Torque Load is lower than threshold	83.00 Nm 0.00 Nm	Engine running		Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Pumping Losses is lower than threshold OR Pumping Losses rate of change signal greater than P2D2 threshold	0.00 Nm/task_100ms 5.19Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Start Up Engine Friction Compensation rate of change haher than a threshold AND Start Up Engine Friction Compensation higher than threshold	41.50 Nm/task_12.5 1.00 Nm	Engine running		Up/down timer 101.78 ms continuous, 0.5 down time multiplier	
			Limited Immediate Indicated Torque request is greater than its redundant calculation plus threshold	83.00 Nm	Engine running		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			Active damping torque reduction greater than threshold OR Active damping torque reduction lower than threshold	83.00 Nm -83.00 Nm	Engine running		Up/down timer 158.94 ms continuous, 0.5 down time multiplier	
			Fuel volume request greater than its redundant calculation plus threshold	9.94 mm3	Engine running No rich combustion mode		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			Absolute value of the sum of the Fuel Volumes in the pulse train minus Fuel Volume Request minus Main Correction greater than threshold	9.94 mm3	Engine Running No rich combustion mode Main pulse quantity already compensated with main correction is greater than or equal to zero		Up/down timer 158.94 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Cumulative Programmed Energizing Time greater then its redundant calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	67.70 us additional value for emission tests: 0.00 us additional value fro CSERS test 0.00 us	Engine running		Up/down timer 158.94 ms continuous, 0.5 down time multiplier	
			Cumulative Desired Energizing Time greater than its redundant calculation plus threshold (Note: when an emission test is performed OR CSERS test is performed the threshold is incremented by a further value)	67.70 us additional value for emission tests: 0.00 us additional value fro CSERS test 0.00 us	Engine Running		Up/down timer 158.94 ms continuous, 0.5 down time multiplier	
			Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal higher than threshold OR Difference between Fuel Rail Pressure Event Based Signal and Fuel Rail Pressure Time Based signal lower than threshold	300.00 MPa -40.00 MPa	Engine running Delta Filtered Pressure value lower than AND Delta Filtered Pressure value greater than	865.00 MPa/s -1,638.00 MPa/s	Up/down timer 458.94 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Absolute difference between Main Correction and its redundant calculation greater than or equal to threshold	9.94 mm3	Engine running No rich combustion mode		Up/down timer 158.94 ms continuous, 0.5 down time multiplier	
			Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than its redundant calculation plus threshold OR (only if cylinder balancing detected a fault) Cylinder Balancing Fuel Quantity Compensation converted in Energizing Time greater than threshold	**P060C_CB safety deadband threshold f (Fuel Rail Pressure)** us **P060C_CB safety deadband threshold f (Fuel Rail Pressure)** us	Engine running		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	**P060C.EIA safety deadband threshold f (Fuel Rail Pressure)** us	Engine cranking or engine running		Up/down timer 158.94 ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA compensation and its redundant calculation greater than threshold	9.94 mm3	Engine cranking or engine running		Up/down timer 158.94 ms continuous, 0.5 down time multiplier	
			Absolute value of the weighted delta energizing time greater then threshold	**P060C_SQA safety deadband threshold f (Fuel Rail Pressure)** us	Ignition State	Accessory, run orcrank	Up/down timer 458.94 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							multiplier	
			Oil Pump Low Pressure Offset Friction greater then zero OR Oil Pump Low Pressure Offset Friction lower then threshold	-20.00 Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Rate of change on fuel mass compensaton for coolant temperature greater than P2D2 threshold	42.21 mg/sec	Engine running No rich combustion mode No cranking phase No fuel cut off request		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			Rate of change on fuel mass compensaton for air temperature greater than P2D2 threshold	100.00 mg/sec	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run orcrank	Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			Absolute value of fuel mass compensated for vehicle speed greater than threshold	4.22 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run orcrank	Up/down timer 158.94 ms continuous, 0.5 down time multiplier	
			Injector Valve Closing Adjustment energizing time correction greater then threshold OR Injector Valve Closing	**P060C_VCA safety max deadband threshold f(Fuel Rail Pressure)** us	Engine Cranking or engine running		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Adjustment energizing time correction lower then threshold	**P060C_VCA safety min deadband threshold f(Fuel Rail Pressure)** us				
			Desired Immediate Indicated torque greater then its redundant calculation plus threshold	83.00 Nm	Engine running		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			rate of change on pumping losses friction due to exhaust brake actuation higher than rate limit OR Pumping losses friction outside min/max authority	Rate of change limit: 0.00 Nm Min: 0.00 Nm Max: 4,096.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Exhaust Brake Torque Capacity less then Threshold	0.00 Nm	Ignition State	Accessory, run orcrank	Up/down timer 475.00 ms continuous, 0.5 down time multiplier	
			Combustion Mode Arbitration Winner is higher than the maximum expected combustion mode OR Previous Combustion Mode Arbitration Winner		Engine cranking or engine running		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			is higher than the maximum expected combustion mode OR Combustion Mode Arbitration Winner is equal to Previous Combustion Mode Arbitration Winner and not equal to Normal combustion Mode					
			The sum of Low, Middle and High Barometric Correction Factors greater than 1		Engine cranking or engine running		Up/down timer 1,958.94 ms continuous, 0.5 down time multiplier	
			Energizing Time correction for Injector Body Temperature greater then threshold	**P060CJBT safety deadband threshold f (Fuel Rail Pressure)**	Engine Cranking or engine runnig		Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			cumulative DT absolute difference beetween secured DT and Programmed DT greater than threshold (torque forming pulses only)	10,000,000.00 us	Engine Cranking or engine runnig		Up/down timer 200.00 ms continuous, 0.5 down time multiplier	
			cumulative SOI absolute difference beetween	180.00 Degrees	Engine Cranking or engine runnig		Up/down timer 200.00	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			secured SOI and Programmed SOI greater than threshold (torque forming pulses only)				ms continuous, 0.5 down time multiplier	
			Absolute value of the difference between the calculated EIA (VSI specific) compensation and its redundant calculation greater than threshold	**P060C_EIA VSI safety deadband threshold f (Fuel Rail Pressure)**	Engine cranking or engine running		Up/down timer 200.00 ms contiuous, 0.5 down time multiplier	
			Fuel mass compensated for exhaust gas tempearture outside min/max autority	-20.00 mg 20.00 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run orcrank	Up/down timer 500.00 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Starter Relay Control Circuit Open (12VSS)	P0615	Controller specific output driver circuit diagnoses the Starter relay (12VSS) low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground.	Starter control diag enable Engine speed Run Crank voltage	Enabled >=0.00 RPM >=11.00 volts	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Starter Relay Control Circuit Low Voltage (12VSS)	P0616	Controller specific output driver circuit diagnoses the Starter relay (12VSS) low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 0.5 Ohms impedance between signal and controller ground	Starter control diag enable Engine speed Run Crank voltage	Enabled >=0.00 RPM >= 6.41 volts	8 failures out of 10 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Starter Relay Control Circuit High Voltage (12VSS)	P0617	Controller specific output driver circuit diagnoses the Starter relay low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Starter control diag enable Engine speed Run Crank voltage	Enabled >=0.00 RPM >= 6.41 volts	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Generator 1 L-Terminal Circuit	P0621	This DTC checks the alternator L-Terminal circuit for electrical integrity during operation.	Impedance across voltage source pin and ground during on or off state indicates open circuit OR Impedance across voltage source pin and controller 5V source during on or off state indicates shorted to power	Open circuit condition: circuit attached to the Controller external connection has an impedance between voltage source pin and controller ground of >= 200 K [Ohm] OR Power short condition: circuit attached to the Controller external connection has an impedance between voltage source pin and controller 5V source of <= 0.5 [Ohm]	Test enabled by calibration; and (Generator present and Generator 1 L-Terminal Circuit test fault in engine running) and Run Crank voltage and No Active DTCs and Engine Running and Engine Crank movement detected and (Starter engaged OR Run Crank voltage above 11.00) for a time)	==0.00 [Boolean] ==1.00 [Boolean] == FALSE >=11.00 [V] CrankSensor_FA CamSensorAnyLocationFA == FALSE == FALSE == FALSE > 1.00 [s]	5.00 [s] (Debouncing performed based on cumulative time in fault condition) Task rate = 250 [ms]	Type A, 1 Trips
			Impedance across voltage source pin and ground during on or off state indicates shorted to ground	Ground short condition: circuit attached to the Controller external connection has an impedance between	Test enabled by calibration; and (Generator present	1.00 [Boolean] ==1.00 [Boolean]	15.00 [s] (Debouncing performed based on cumulative time in fault condition)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR Impedance across voltage source pin and controller 5V source during on or off state indicates shorted to power	voltage source pin and controller ground of <= 0.5 [Ohm] OR Power short condition: circuit attached to the Controller external connection has an impedance between voltage source pin and controller 5V source of <= 0.5 [Ohm]	and Generator 1 L-Terminal Circuit test fault in key on) and No Active DTCs and Engine Running and Generator control disabled and Generator Service Device Control Command Request	== FALSE CrankSensor_FA CamSensorAnyLocationFA == TRUE == FALSE == FALSE	Task rate = 250 [ms]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Generator 1 F-Terminal Circuit	P0622	This DTC checks the alternator F-Terminal circuit for electrical integrity during operation.	Generator field winding duty cycle	>= 65.00 [Pct]	Test enabled by calibration; and (Generator present and Generator 1 F-Terminal Circuit test fault in engine running) Run Crank voltage and No Active DTCs and Engine Running and Engine Crank movement detected and (Starter engaged OR Run Crank voltage above 11.00) for a time)	1.00 [Boolean] ==1.00 [Boolean] == FALSE >=11.00 [V] CrankSensor_FA CamSensorAnyLocationFA == FALSE == FALSE == FALSE 1.00	5.00 [s] (Debouncing performed based on cumulative time in faulty condition) Task rate = 50 ms	Type A, 1 Trips
			Generator field winding duty cycle	<= 5.00 [Pct]	Test enabled by calibration;	1.00 [Boolean]	5.00 [s] (Debouncing performed based on cumulative	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and (Generator present and Generator 1 F-Terminal Circuit test fault in key on) and Engine speed and L-Terminal_FA and Generator 1 F-Terminal present and Generator PWM command and No Active DTCs and Engine Running and Generator control disabled and Generator Service Device Control Command Request	==1.00 [Boolean] == FALSE < 1,000.00 [rpm] == FALSE == 1.00 [Boolean] > 42.00 [Pct] CrankSensor_FA CamSensorAnyLocationFA == TRUE == FALSE == FALSE	time in faulty condition) Task rate = 50 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and controller ground	Run/Crank Voltage	Voltage 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Relay Control Circuit High Voltage	P0629	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Run/Crank Voltage	Voltage 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P0627 may also set (Fuel Pump Relay Control Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type B, 2 Trips
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks that the VIN is correctly written	At least one of the programmed VIN digits	Is not a valid ASCII character	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1 by monitoring the reference percent Vrefl and failing the diagnostic when the percent Vrefl is too low or too high or if the delta between the filtered percent Vrefl and non-filtered percent Vrefl is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vrefl < or ECM percent Vrefl > or the difference between ECM filtered percent Vrefl and percent Vrefl > (100% corresponds to 5.5 Volt)	88.64 % Vrefl 93.18% Vrefl 0.90 % Vrefl	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 25.00 Seconds = FALSE > 8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2 by monitoring the reference percent Vref2 and failing the diagnostic when the percent Vref2 is too low or too high or if the delta between the filtered percent Vref2 and non-filtered percent Vref2 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref2 < or ECM percent Vref2 > or the difference between ECM filtered percent Vref2 and percent Vref2 > (100% corresponds to 5.5 Volt)	88.64 % Vref2 93.18% Vref2 0.90 % Vref2	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 25.00 Seconds = FALSE > 8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Relay Control (ODM) Open	P0685	Detects an open circuit in the Powertrain Relay driver. This diagnostic reports the DTC when an open circuit failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: > 200 K Q ohms impedance between output and controller ground	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Relay Control (ODM) Low	P0686	Detects a short to ground in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to ground failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to ground: < 0.5 Ω impedance between output and controller ground	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Relay Control (ODM) High	P0687	Detects a short to power in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to power failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: < 0.5 Q impedance between output and controller power	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Detects low voltage in the control module relay feedback circuit. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Control module relay feedback circuit low voltage	Powertrain relay voltage <=5.00	Powertrain relay short low diagnostic enable Run Crank voltage Powertrain relay state	= 1.00 >9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Relay Feedback Circuit High	P0690	Detects higher than expected voltage in the powertrain relay feedback circuit. This diagnostic reports the DTC when higher than expected voltage is present. For example, the powertrain relay could be stuck on. Monitoring occurs when the relay is commanded "off" for a calibrated duration.	Powertrain Relay Voltage	>= 4.00 volts will increment the fail counter	Powertrain relay commanded “OFF” No active DTCs:	>=2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on the 5 volt reference circuit #3 by monitoring the reference percent Vref3 and failing the diagnostic when the percent Vref3 is too low or too high or if the delta between the filtered percent Vref3 and non-filtered percent Vref3 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref3 < or ECM percent Vref3 > or the difference between ECM filtered percent Vref3 and percent Vref3 > (100% corresponds to 5.5 Volt)	88.64 % Vref3 93.18% Vref3 0.90 % Vref3	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 25.00 Seconds = FALSE > 8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on the 5 volt reference circuit #4 by monitoring the reference percent Vref4 and failing the diagnostic when the percent Vref4 is too low or too high or if the delta between the filtered percent Vref4 and non-filtered percent Vref4 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref4 < or ECM percent Vref4 > or the difference between ECM filtered percent Vref4 and percent Vref4 > (100% corresponds to 5.5 Volt)	88.64 % Vref4 93.18% Vref4 0.90 % Vref4	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 25.00 Seconds = FALSE > 8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Torque Managment System - Forced Engine Shutdown	P06AF	This diagnostic is monitoring that the TCM is processing code correctly. The TCM computes the correct pattern sent via a CAN message to the monitoring ECM. When the ECM does not receive a correct pattern or a missing pattern to the monitoring ECM, the DTC is set.	Received pattern from the TCM OR Received malfunction pattern	# expected pattern >= 2 counts	 Run Crank Active Time	Run or Crank >= 0.63 seconds	6/12 counts or 2.00 seconds continuous; 25 ms/count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit/Open	P06DA	Controller specific output driver circuit diagnoses the oil pump low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit > 200 k Q impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	>11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DB may also set (Engine Oil Pressure Control Circuit Short To Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit Low	P06DB	Controller specific output driver circuit diagnoses the oil pump low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit < 0.5 Q impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controllers P06DA may also set (Engine Oil Pressure Control Circuit Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit High	P06DC	Controller specific output driver circuit diagnoses the oil pump low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to Power < 0.5 Q impedance between output and controller power	Powertrain Relay Voltage Run/Crank Active Cranking State	>11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Oil Pump Control Circuit Performance - Continuously Variable Displacement Oil Pump	P06DD	Diagnoses the performance of the oil pump controls. The test determines if the oil pump is capable of meeting the pressure demand.	Absolute Oil Pressure Error = ABS [Desired Oil Pressure - Measured Oil Pressure] A first-order lag filter is applied to the error value, every 100ms: Filtered Pressure Error = Previous Error + 0.00250 *(New Error - Previous Error) <u>Fail from passing state:</u> Filtered Oil Pressure Error is greater than a threshold AND the cycler algorithm is unable to clear the fault. <u>Pass from failing state:</u>	Filtered Pressure Error > 40.00 kPa AND Cycler Algorithm has cycled the pump solenoid for 1.80 seconds AND Filtered Pressure Error ≥ **P06DD_CVDOP_MaxPressErr** after the cycler is complete	<u>Common Criteria:</u> Closed Loop Pump Control Active Engine Running Powertrain Relay Voltage Desired Oil Pressure in Range Oil Temperature in Range Engine Speed in Range	>11.00 **P06DD_CVDOP_MinDesPres** < Desired Oil Pressure < **P06DD_CVDOP_MaxDesPress** 40.00 °C < Oil Temp < 120.00 °C 1.000RPM <= Engine Speed <= 4,500	Performed every 100ms.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Filtered Oil Pressure Error is less than a threshold	Filtered Pressure Error < **P06DD_CVDOP_Max PressErr**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Engage Neutral	P073D	Detects the inability to achieve or remain in Neutral.	Actual Arbitrated Transmission Range	≠Neutral	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup cal must be =6 to enable a type B DTC:	= Good value = Neutral =False =False =True = True =True =Park =False 6.00	10,000.00 msec from Park 10,000.00 msec from Reverse 10,000.00 msec from Drive	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Engage Reverse	P073E	Detects the failure to achieve the expected command to Reverse range.	Actual Arbitrated Transmission Range	≠Reverse	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup cal must be =6 to enable a type B DTC:	= Good value = Reverse =False =False =True =True =True =Park =False 6.00	10,000.00 msec from Park 3,600,000.00 msec from Neutral* 3,600,000.00 msec from Drive* internal does not diagnose from N&D	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch A Circuit Low	P07B3	The Park Button Circuit Diagnostic detects a reading LowCorrelation diagnosis compares the two switches behind the Park pushbutton	Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts 1023 counts = 5 Volts	The enabling calibration must be set to 6 to enable a type B DTC:	6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch A Circuit High	P07B4	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	The enable calibration for this DTC must be set to 6 to enable a type B DTC:	6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch B Circuit Low	P07B9	The Park Button Circuit Diagnostic detects a reading Low	Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration The enabling calibration must be set to 6 to enable a type B DTC:	=TRUE 6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch B Circuit High	P07BA	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration The enabling calibration for this DTC must be set to 6 to enable a type B DTC:	=TRUE 6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Sensor/ Switch B Circuit Performance	P07BB	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration DTC not set The enabling calibration for this DTC must be set to 6 to enable a type B:	=TRUE P07BA or P07B9 6.00	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	Type B two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Switch A/B Correlation	P07BE	Correlation diagnosic compares the two switches behind the Park pushbutton	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states. Park 1 and Park 2 are both:	=Valid, but not equal continuously = valid states (RELEASED or PRESSED), but disagree.	Not Fault Active Diagnostic System Disable Calibration: Park Comparison Diagnostics Enable Calibration: Vehicle speed: Cal must be =6 to enable type B DTC:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB =FALSE = TRUE <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 . 6.00	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B, two trips.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Engage Park	P07E4	Detects the inability to achieve or remain in Park.	Actual Arbitrated Transmission Range	#Park	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup cal must be =6 to enable a type B DTC:	= Good value = Park =False =False =True = True =True =Park =False 6.00	10,000.00 msec from Reverse 10,000.00 msec from Neutral 10,000.00 msec from Drive	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Engage Drive	P07E5	Detects the failure to achieve the expected command to Drive range.	Actual Arbitrated Transmission Range	#Drive	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup cal must be =6 to enable a type B DTC:	= Good value = Drive =False =False =True = True =True =Park =False 6.00	10,000.00 msec from Park 10,000.00 msec from Reverse 10,000.00 msec from Neutral	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever X Position Sensor 1 Circuit Range/ Performance	P082A	Detects Gear Lever X Position Sensor 1 circuit is reading outside expected values	Gear Lever Position Sensor 1 Measured Duty Cycle on X OR Gear Lever Position Sensor 1 Frequency error detection flag on X OR Gear Lever Position Sensor 1 Measured Duty Cycle on X and Gear Lever Position Sensor 2 Measured Duty Cycle on X differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path OR = True >12.00%	Not Fault Active Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	P082B, P082C 0.05 seconds 6.00	10.00 failures out of 12.00 samples 25ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever X Position Sensor 1 Circuit Low	P082B	Detects Gear Lever X Position Sensor 1 circuit reading low	Gear Lever Position Sensor 1 Measured Duty Cycle on X	< 5.00 %	Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever X Position Sensor 1 Circuit High	P082C	Detects Gear Lever X Position Sensor 1 circuit reading high	Gear Lever Position Sensor 1 Measured Duty Cycle on X	> 95.00%	Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever Y Position Sensor 1 Circuit Performance	P082D	Detects Gear Lever Y Position Sensor 1 circuit is reading outside expected values	Gear Lever Position Sensor 1 Measured Duty Cycle on Y OR Gear Lever Position Sensor 1 Frequency error detection flag on Y	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True	Not Fault Active Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	P082E, P082F 0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever Y Position Sensor 1 Circuit Low	P082E	Detects Gear Lever Y Position Sensor 1 circuit reading low	Gear Lever Position Sensor 1 Measured Duty Cycle on Y	< 5.00 %	Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever Y Position Sensor 1 Circuit High	P082F	Detects Gear Lever Y Position Sensor 1 circuit reading high	Gear Lever Position Sensor 1 Measured Duty Cycle on Y	> 95.00 %	Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever X Position Sensor 2 Circuit Performance	P089B	Detects Gear Lever X Position Sensor 2 circuit is reading outside expected values	Gear Lever Position Sensor 2 Measured Duty Cycle on X OR Gear Lever Position Sensor 2 Frequency error detection flag on X OR Gear Lever Position Sensor 2 Measured Duty Cycle on X and Gear Lever Position Sensor 1 Measured Duty Cycle on X differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True >12.00%	Not Fault Active Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	P089C, P089D 0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever X Position Sensor 2 Circuit Low	P089C	Detects Gear Lever X Position Sensor 2 circuit reading low	Gear Lever Position Sensor 2 Measured Duty Cycle on X	< 5.00%	Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever X Position Sensor 2 Circuit High	P089D	Detects Gear Lever X Position Sensor 2 circuit reading high	Gear Lever Position Sensor 2 Measured Duty Cycle on X	> 95.00 %	Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever Y Position Sensor 2 Circuit Performance	P08A0	Detects Gear Lever Y Position Sensor 2 circuit is reading outside expected values	Gear Lever Position Sensor 2 Measured Duty Cycle on Y OR Gear Lever Position Sensor 2 Frequency error detection flag on Y OR Gear Lever Position Sensor 1 Measured Duty Cycle on Y and Gear Lever Position Sensor 2 Measured Duty Cycle on Y differ by more than	Are outside the shifter path of movement 5.5% to meet 100 Nm force on shifter from nominal path = True > 12.00%	Not Fault Active Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	P08A1, P08A2 0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever Y Position Sensor 2 Circuit Low	P08A1	Detects Gear Lever Y Position Sensor 2 circuit reading low	Gear Lever Position Sensor 2 Measured Duty Cycle on Y	< 5.00%	Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Lever Y Position Sensor 2 Circuit High	P08A2	Detects Gear Lever Y Position Sensor 2 circuit reading high	Gear Lever Position Sensor 2 Measured Duty Cycle on Y	> 95.00%	Controller has been awake for at least Cal must be equal to 6 to enable a type B DTC:	0.05 seconds 6.00	10.00 failures out of 12.00 samples 25 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Voltage Sensor A Range/ Performance	P0E32	Detects DC/DC Converter Actuator Voltage 1 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 2 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Engine running OR Engine stopped Battery Voltage	1 1 TRUE TRUE FALSE for >160 loops in 12.50 ms loop for >160 loops in 12.50 ms loop >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips
			Stabilize Mode- Auto-Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 2 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Engine auto-cranking Battery Voltage	1 1 TRUE TRUE FALSE for>0 loops in 12.50 ms loop >= 6.60 Volts	8 failed samples out of 16 samples in 12.50 ms loop	
			Stablize Mode-Auto-Cranking Events: Number of failed auto-cranking events exceeds threshold	> 2 failed auto-cranking events	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory)	1 1 TRUE	2 failed auto-crank events out of 3 consecutive auto-crank events	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Engine auto-cranking	 TRUE FALSE has occurred		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Voltage Sensor A Low	P0E33	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 1	< 1 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Battery Voltage	1 1 TRUE TRUE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Voltage Sensor A High	P0E34	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 1	> 28 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Battery Voltage	1 1 TRUE TRUE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Voltage Sensor B Range/ Performance	P0E37	Detects DC/DC Converter Actuator Voltage 2 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	>2 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Engine running OR Engine stopped Battery Voltage	1 1 TRUE TRUE FALSE for >160 loops in 12.50 ms loop for >160 loops in 12.50 ms loop >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips
			Stabilize Mode- Auto-Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 2 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Engine auto-cranking Battery Voltage	1 1 TRUE TRUE FALSE for> 0 loops in 12.50 ms loop >= 6.60 Volts	8 failed samples out of 16 samples in 12.50 ms loop	
			Stablize Mode-Auto-Cranking Events: Number of failed auto-cranking events exceeds threshold	> 2 failed auto-cranking events	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory)	1 1 TRUE	2 failed auto-crank events out of 3 consecutive auto-crank events	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Engine auto-cranking	 TRUE FALSE has occurred		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Voltage Sensor B Low	P0E38	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 2	< 1 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Battery Voltage	1 1 TRUE TRUE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Voltage Sensor B High	P0E39	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 2	> 28 Volt	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) Battery Voltage	1 1 TRUE TRUE FALSE >= 6.60 Volts	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Reset Error	P1005	This diagnostic is intended to monitor a message from the Fuel Pump Driver Control Module/Fuel Tank Zone Module and use the information in the message to diagnose if the module is resetting unexpectedly. The message contains the time since the last reset as measured by the module. If the time since the last reset decreases from one message to another without indicating that a timer rollover occurred, a reset of the external module will be indicated. If too many resets occur in a sample window the diagnostic will fail.	If the diagnostic has detected that an unexpected reset has occured: The time since last module reset event data value received from the FPDCM/FTZM is less than the previous value and also And The rollover occurred value received from the FPDCM/FTZM is false for out of total samples	<=0.50 seconds >=2.00 counts >=400.00 counts	DTC is enabled Sensor bus relay is on Battery voltage No FTZM reconfiguration is requested for A new message that contains the FPDCM/ FTZM reset data is received The following DTCs that diagnose the message that contains the FPDCM/ FTZM reset data are not active: P1000 U18A2	Enabled > 11.00 Volts 1.00 second(s)	This diagnostic samples every 100.00 milliseconds.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Control Circuit Shorted	P1006	This monitor checks whether the Engine Coolant Flow Control Valve DC motor wires are shorted to one another.	Current flowing through the DC motor driver higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled Error indication provided by HWIO	== 1.00 > 11.00 [V] == False == True != Indeterminate	20.00 fails out of 25.00 samples Sampling rate: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Motor Driver Temperature Too High	P100F	This monitor checks whether the temperature of the Engine Coolant Flow Control Valve DC motor driver is too high.	DC motor driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled Error indication provided by HWIO	== 1.00 > 11.00 [V] == False == True != Indeterminate	20.00 fails out of 25.00 samples Sampling rate: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Position Sensor Exceeded Minimum Learning Limit	P1010	This monitor checks whether the Engine Coolant Flow Control Valve positions at the mechanical end stops are out of range.	SENT position raw value at the fully open mechanical stop lower than a threshold OR SENT position raw value at the fully open mechanical stop higher than a threshold	< 4.00 [%5V] > 9.20 [%5V]	Test enabled Run/crank active Engine moving Engine coolant temperature OR OBD Coolant Temp enabled Engine coolant temperature OR OBD Max Coolant Temp achieved Engine coolant temperature fault active Actuator fault SENT position sensor fault Valve perfomance test failed this key on End of Trip event occurred	== 1.00 == False == False > -50.00 [°C] == True < 150.00 [°C] == False ECT_Sensor_FA == False PECR_Actr_Flt == False PECR_PstnSnsr_Flt == False PECR_Obstruction_TFTKO == False == True	Within 60.00 [s] after engine shutdown	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit Open	P1029	This DTC detects if any of the 3phase fuel pump control circuits is Open [system configuration "Brushless"] The diagnostic can detect open circuit faults when the fuel pump is not rotating. In the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. This process is completed in less than 1 millisecond. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are	Phased-pair circuit voltage	3V <= V [back-EMF] <= 6V	a) Sensed fuel pump speed b) Device configuration Chassis Fuel Pres System type c) Diagnostic is .. d) CAN Sensor Bus message $3EC Available e) Sensor Bus Relay On f) Sensor Bus B Message $3EC Temp Signal Message Counter Incorrect [Info7]	a) == 0 RPM b) == Brushless motor c) ENABLED d) == TRUE e) == TRUE f) == False	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds. This open circuit diagnostic follows "smart device" Component Technical Specifications.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit Low	P102A	This DTC detects if the fuel pump control circuit is shorted to low [Short to Ground] The diagnostic detects short-to-ground faults using 2 methods depending on whether the fuel pump is rotating. 1) In the "rotating" state, voltage drop across each phase-pair high-side drive is monitored, or 2) in the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-	Phased-pair circuit voltage Difference	Vdelta > 0.145 V	a) Chassis Fuel Pres System type Device configuration b) Diagnostic is .. c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [Info7]	a) == Brushless motor b) Enabled c) == TRUE d) == TRUE e) == False	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips
			Phased-pair circuit voltage	V [back-EMF] >= 6 V	a) Sensed fuel pump speed b) Chassis Fuel Pres System type Device configuration c) Diagnostic is .. d) CAN Sensor Bus message $3EC Available e) Sensor Bus Relay On f) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [Info7]	a) == 0 RPM b) == Brushless motor c) Enabled d) == TRUE e) == TRUE f) == False	40.00 failures / 80.00 samples 1 sample / 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		phase signal wherein only 2 phases are active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds. This open circuit diagnostic follows "smart device" Component Technical Specifications.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Phase U-V-W Circuit High	P102B	This DTC detects if the fuel pump control circuit is shorted to high voltage [Short to Battery] The diagnostic detects short-to-battery faults using 2 methods depending on whether the fuel pump is rotating. 1) In the "rotating" state, voltage drop across each phase-pair low-side current shunt is monitored, or 2) in the "stopped" state, small currents are injected into each motor phase circuit pair by an internal fixed source and corresponding back-EMF voltage is monitored. A fault is reported when the monitored voltage falls into a specific range [adjusted for source voltage]. The FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the	Phased-pair circuit voltage Difference	Vdelta > 0.4 V	a) Diagnostic is .. b) Device configuration Chassis Fuel Pressure SysType == FTZM Electronically Commutated c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect	a) Enabled b) == TRUE c) == TRUE d) == TRUE e) == False	40.00 failures / 80.00 samples 1 sample / 12.5 ms	Type A, 1 Trips
			Phased-pair circuit voltage	V[backEMF] > 6 V	a) Diagnostic is .. b) Sensed fuel pump speed b) Device configuration Fuel Pressure System Type == FTZM Electronically Commutated c) CAN Sensor Bus message $3EC_Avail d) Sensor Bus Relay On e) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect	a) Enabled b) == 0 RPM b) == TRUE c) == TRUE d) == TRUE e) == False	40.00 failures/ 80.00 samples 1 sample / 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless fuel pump speed is inferred using the rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 milliseconds. This open circuit diagnostic follows "smart device" Component Technical Specifications.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injection Valve Supply Voltage Circuit Low Bank 1 Unit 1	P1048	This diagnosis verifies if a DEF dosing valve high side short to ground occurred	HWIO interface DEFMV_ENABLE_GROUND_SHORT = Fault	VeHWIO_e_DEFMV_Enbl_Gsht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_GROUND_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injection Valve Supply Voltage Circuit High Bank 1 Unit 1	P1049	This diagnosis verifies if a DEF dosing valve high side short to power occurred	HWIO interface DEFMV_ENABLE_POWER_SHORT = Fault	VeHWIO_e_DEFMV_Enbl_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_POWER_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = lOOms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Position Sensor Stop Performance	P1098	Performance Check This DTC checks for an invalid endstop learn. The valve is moved against each endstop. If the learned position is out of range a DTC will be set.	If any of the following conditions are met a failure will be recorded: Condition 1 (closed): Learned bypass valve position or and the learn has completed Condition 2 (open): Learned bypass valve position or and the learn has completed	>0.00 degrees <-12.00 degrees >315.00 degrees <309.00 degrees	Diagnostic is Enabled No DTCs Engine Diag System Bypass Valve Learn Engine Outlet Coolant OR OBD Coolant Enable Criteria Engine Outlet Coolant AND Engine Hot Light	EECR_EngineOutlet_FA VECR_MRV_LoC_FA VECR_MRV_PstnSnsrCkt_FA VECR_MRV_PstnSnsrCkt_TFTKO VECR_MRV_PstnPerf_FA = Enabled = Successful or Inprogress >-40.0 °C = TRUE <9,999.0 °C = Inactive	Within 60.0 seconds after engine shutdown.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Supply Circuit Low	P109F	Circuit Continuity Controller specific output driver circuit detects a short to ground in the supply circuit for the Engine Coolant Bypass Valve C when the H-Bridge is energized.	Supply voltage	< 6 V	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking Engine Diag System Driver under voltage status is not	 = True = True = Enabled = Indeterminate	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Control Circuit Shorted	P10A1	Controller specific output driver circuit detects a short to ground in the load circuit for the Engine Coolant Bypass Valve C when the H-Bridge is energized.	Current measurement outside of controller specific acceptable range when H-Bridge is energized	9.8A<X<15.8A	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking Engine Diag System Driver control circuit load short status is not	 = True = True = Enabled = Indeterminate	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Actuator Driver Temperature Too High	P10A2	Controller specific temperature threshold. If temperature becomes too high this DTC will set.	Temperature measurement outside of controller specific acceptable range.	> 105°C	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking Engine Diag System Driver overtemperature status is not	 = True = True = Enabled = Indeterminate	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Pump Speed Performance	P10BA	This DTC indicates a pump speed performance failure. Two fault paths are considered. When pump is commanded with pump speed > 0 and commanded pump speed = 0. When the On path fails, the off path is disabled until the ON path completes a OK cycle.	Absolut pump speed error =Abs(Desired pump speed - Actual Pump Speed) For mor than	**> errLim** rpm **> PmpSpdDiagDly** sec	Pump H/W present Diagnostic enabled **************************** Desired pump speed **************************** Powertrain relay voltage Or WCP direct connected too Batt (Coolant Temp OR OBD Coolant enable Criteria) AND (Coolant Temp OR OBD max Coolant Temp achieved)**************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No CAC device control acitve - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** > 0 rpm **************************** >=11.0 Volts False > 40.00 C =TRUE <= 126.00 C =FALSE ****************************	16 failures out of 20 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Temperature - Exhaust Gas Temperature Not Plausible	P10D1	This monitor measures the temperature of DEF injector coil and compares to reference temperature after long soak.	Difference between coil temperature and reference temperature greater than calibratable value.	>55.00	Test enabled by calibration (TRUE->Enable False -> Disable)	1.00	Single decision criteria. Function Task: 25ms	Type B, 2 Trips
					DEF Injector Fault State (No fault on injector)	== FALSE		
					Powertrain relay in range	==TRUE		
					Long Engine off soak period has elapsed (sec)	>= 28,800.00		
					Service Test	== FALSE		
					Run/Crank is Active	==TRUE		
					Engine in Cranking Phase	== FALSE		
					Powertrain Relay in-Range	==TRUE		
					Diag System Disable	== FALSE		
					Coil Temp Rationality Diag Inhibited	== FALSE		
					Coil Temperature Estimation Available	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator C Solenoid Supply Voltage Control Circuit Low	P10E6	This DTC detects a short circuit to ground of the high side driver circuit of the Fuel Metering Unit valve 2	Voltage high across High Side driver of the Fuel Metering Unit valve 2 during ON state indicates short toground	Impedence between High Side pin of the Fuel Metering Unit valve 2 and the controller ground < 0.5 Q	Powertrain relay voltage Engine cranking Run crank active	> 11.00 V == FALSE ==TRUE	7.00 failures out of 14.00 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator C Solenoid Supply Voltage Control Circuit High	P10E7	This DTC detects a short circuit to high voltage of high side driver circuit of the Fuel Metering Unit valve 2	Voltage low across High Side driver of the Fuel Metering Unit valve 2 during OFF state indicates short to power	Impedence between High Side pin of the Fuel Metering Unit valve 2 and the controller power < 0.5 Q	Powertrain relay voltage Engine cranking Run crank active	> 11.00 V == FALSE ==TRUE	7.00 failures out of 14.00 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator A Control Circuit Shorted	P10E8	This DTC detect a short circuit between the high and low side pins of the Fuel Metering Unit valve.	Current high across High and Low Side drivers during ON state indicates a shorted load.	Current achieves the 2 A threshold in 2 us	Powertrain relay voltage Engine cranking Run crank active	>11.00 == FALSE ==TRUE	7.00 failures out of 14.00 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator C Control Circuit Shorted	P10EA	This DTC detect a short circuit between the high and low side pins of the Fuel Metering Unit valve 2.	Current high across High and Low Side drivers during ON state indicates a shorted load.	Current achieves the 2 A threshold in 2 us	Powertrain relay voltage Engine cranking Run crank active	> 11.00 V == FALSE ==TRUE	7.00 failures out of 14.00 samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module 5V Reference 2 Circuit	P1177	This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 2 Circuit.	Raw Fuel Pump Driver Control Module 5V Reference 2 is or Raw Fuel Pump Driver Control Module 5V Reference 2 is or Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 2 and Raw Fuel Pump Driver Control Module 5V Reference 2 is For a non-continuous failure of out of For a continuous failure of	> 92.25 Percent <87.75 Percent > 99.00 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage PT Sensor Bus Relay The following DTCs that diagnose the message that contains the FPDCMZ FTZM reference circuit data are not active: P165C U0076 U18A2	Enabled >= 11.00 Volts Commanded on (if present)	Samples every 11.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1178	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is or Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is or Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is For a non-continuous failure of out of For a continuous failure of	> 92.25 Percent <87.75 Percent > 99.00 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage PT Sensor Bus Relay The following DTCs that diagnose the message that contains the FPDCMZ FTZM reference circuit data are not active: P1200 U0076 U18A2	Enabled >= 11.00 Volts Commanded on (if present)	Samples every 250.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Position Sensor Circuit Low Voltage	P118A	This diagnostic continuously detects if the Block Rotary Valve Position Feedback signal is too low and out of the expected operating range, defined by any position below the lower mechanical end-stop. If the enable criteria are met and the raw position feedback is below the out of range low position fail threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met. This diagnostic will suspend when a matured fault is detected while the valve is performing the integrity check and will re-enable when the valve performs the integrity check again at the end of the next drive cycle.	Coolant Valve Position Feedback	< -7.00°	Diagnostic is Enabled 12V System Voltage VECR_BRV_PstnFdbk_Av, VECR_BRV_PstnFdbk_Fol PowertrainRelayStateOn_FA, Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Diagnostic Position Override Enable	>= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = True = False	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Multiple Pressure Sensor Correlation Performance (3 intake air pressure sensor configuration)	P1199	This monitor is used to identify if BARO, MAP and TCIAP pressure values are irrational when compared to each other. The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The BARO, MAP and TCIAP sensors values are checked to see if they are within the normal expected atmospheric pressure range. If they are, then BARO, MAP and TCIAP are compared to see if their values are similar.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P1199: Maximum pressure difference** kPa] > **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	480.00 fail counters over 600.00 sample counters sampling time is 12.5 ms for applications without LIN MAF sampling time is 25 ms for applications with LIN MAF	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		If the three sensors are not in agreement the monitor is not able to pinpoint the sensor(s) that is/are not working correctly and therefore indicates that there is a fault that impacts the three sensors.				ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Position Sensor Circuit High Voltage	P11C9	This diagnostic continuously detects if the Block Rotary Valve Position Feedback signal is too high and out of the expected operating range, defined by any position above the upper mechanical endstop. If the enable criteria are met and the raw position feedback is greater than the out of range high fail threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met. This diagnostic will suspend when a matured fault is detected while the valve is performing the integrity check and will re-enable when the valve performs the integrity check again at the end of the next drive cycle.	Coolant Valve Position Feedback	> 117.00°	Diagnostic is Enabled 12V System Voltage VECR_BRV_PstnFdbk_AV, VECR_BRV_PstnFdbk_Fol PowertrainRelayStateOn_FA, Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Diagnostic Position Override Enable	 >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = True = False	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions. The FTZM ERFS control may adjust the PWM slew rate or frequency as a self-protection method, but may not reduce pump rotational speed or impact pumping performance in any way due to an over-temperature condition.	Fuel Pump Driver Temperature	T > 160 degC	a) Diagnostic is .. b) Sensor Bus Relay On c) CAN Sensor Bus message $3EC_Available d) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZ MJ nfo7_ARCChkErr]	a) Enabled b) == TRUE c) == TRUE d) <> TRUE	5.00 failures / 10.00 samples 1 sample / 100 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor B Circuit Low Voltage	P127C	Determine when a short circuit to ground affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	< 4.0 %	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed Diagnostic feedback protocol is not in the *check low state*	= CeFHPG_e_RPS_DoubleTrack > 15,000 s > 8.4 V	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure (FRP) Sensor B Circuit High Voltage	P127D	Determine when a short circuit to voltage affects fuel rail pressure (secondary) sensor.	Fuel rail pressure sensor output (as percentage of supply voltage)	> 96.0%	**Rail Pressure Sensor Configuration** Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage An initilization time delay of 12.00 consecutive samples has been passed Diagnostic feedback protocol is not in the *check high* state	= CeFHPG_e_RPS_Double Track > 15,000 s > 8.4 V	15 failures out of 30 samples OR 15 continuous failures out of 30 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module System Voltage Low (Only on applications that use an FTZM)	P129B	Detects low voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage drops below a calibrated value.	Fuel Pump Driver Control Module System Voltage Low	Fuel Tank Zone Module (FTZM) Battery Voltage <= 9.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Starter motor not engaged Sensor Bus relay is commanded ON	 = 1	50 failures out of 63 samples 12.5 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module System Voltage High (Only on applications that use an FTZM)	P129C	Detects high voltage of the fuel pump driver control module. This diagnostic reports the DTC when the fuel pump driver control module voltage exceeds a calibrated value.	Fuel Pump Driver Control Module System Voltage High	Fuel Tank Zone Module (FTZM) Battery Voltage >= 18.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Sensor Bus relay is commanded ON	 = 1	50 failures out of 63 samples 12.5 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect	P129F	FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless pump speed is inferred using rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 millisecs. Diagnostic software [FABR ring] calculates the error between the commanded, arbitrated fuel pump speed [FCBR ring] and the FTZM sensed fuel pump speed. The error is filtered and evaluated against calibratable threshold limits to determine pass/fail status. Any failure that exists on the fuel pump output circuit (3 phases) will be manifested in a Fuel Pump Speed	Sensed Filtered Fuel Pump Speed Error	> Speed Error Low Threshold [Supporting Table] **P129F Threshold Low** OR < Speed Error High Threshold [Supporting Table] **P129F Threshold High**	a) Diagnostic is .. b) CAN Sensor Bus message $0CB_Available c) FABR Fuel Control Enable Fault Active d) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr] e) FABR Fuel Pump Ckt FA f) FABR Driver OverTemp FA 9) Run_Crank input Voltage h) Sensor Bus Relay On j) CAN Sensor Bus message $0CB Data Fault [CFMR_b_FTZM_Info8_ARCChkErr] k) CAN Sensor Bus message $0CB Comm Fault [CFMR_b_FTZM_Info8_UcodeCmFA] l) Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA] m) Timer - FABR Rising Edge Diagnostic Delay n) Timer - FABR Falling Edge Diagn Delay	a) Enabled b) == TRUE c) <> TRUE d) <> TRUE e) <> TRUE f) <> TRUE g) > 9.00 volts h) == TRUE j) <>TRUE k) <> TRUE l) <>TRUE m) > 2.30 seconds n) > 0.90 seconds	1 sample / 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Rationality Diagnostic fault. Reported fuel pump speed data will only be consumed in this same diagnostic.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Enable Circuit Performance	P12A6	The purpose of the Fuel Pump Driver Control Module Enable Circuit Performance diagnostic is to detect if the state of the fuel control enable circuit is valid. This is done by comparing the fuel control enable circuit state [high or low] sensed by the Fuel Tank Zone Module device to the commanded state of the fuel control enable signal from the ECM [in serial data]. When the sensed state does not match the commanded state, the fail counter increments.	Sensed Fuel Control Enable circuit state [Fuel Tank Zone Module device]	<> Fuel Control Enable Active command [serial data]	a) Diagnostic is .. b) Sensor Bus message $0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZM_Info2_ARCChkErr] c) CAN Sensor Bus message $OCC_Available d) Sensor Bus Relay On e) Timer [FABR t RunCrankActive]	a) Enabled b) <> TRUE c) == TRUE d) == TRUE e) >= 0.51 seconds	40.00 failures / 80.00 samples 1 sample / 12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Stop Performance	P1387	This is an intrusive diagnostic that runs at the end of every drive cycle for detecting the valve hardware integrity. The valve is commanded to both the lower range and upper range boundary. If the valve hardware is not broken, the valve shall return feedback at the endstop positions. Otherwise, the feedback will return out of range feedback. A diagnostic determination is reported at the completion of the procedures. If both endstops return pass, then a PASS is reported, If any of the endstops returns a fail, then a FAIL is reported.	**Lower Endstop:** Coolant Valve Position Feedback **Upper Endstop:** Coolant Valve Position Feedback	<= -7.00 ° >= 117.00°	Diagnostic is Enabled 12V System Voltage No pending DTCs No Active DTCs Powertrain Relay Commanded On Engine Block Coolant Temperature is Used on this application Run Crank Active Coolant System Mode	>= 11.00 V (hystersis disable < 10.00 V) VECR_BRV_PstnFdbk_Av VECR_BRV_PstnFdbk_Fol PowertrainRelayStateOn_FA Powertrain Relay Feedback Circuit DTCs P0689, P0690 = True >= -34.00 °C (hystersis disable <= -35.00 °C) = False = Coolant System Initialization	Both endstop tests occur in series and both must complete before a decision is made. **Lower Endstop:** 4 seconds out of a 5 seconds window **Upper Endstop:** 4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure High Control Circuit Low	P13B1	Controller specific output driver circuit diagnoses the oil pump high-sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit < 0.5 Ω impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controllers P06DA may also set (Oil Pump Control Circuit Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HP EGR Slow Response - Increasing Flow (OBDII market only)	P140B	This monitor (in increasing flow direction) detects failures in the air system such to not fulfilll the request of HP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the HP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the HP EGR flow slow response monitor is to detect small obstructions in the exhaust pipe. This monitor could also detect slow responding HP EGR valve, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the HP EGR flow response time.	Error difference (absolute value) between the desired HP EGR rate and the actual HP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140B: Increasing HP EGR slow response threshold [%]**	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Air control active condition lasts for a time Desired EGR rate No active transition from a combustion mode to another one (Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	I.00==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > I I .00 [V] Refer to "Air Control Active" Free Form > 0.02 [s] > 0 [%] ==TRUE > 30.00 [°C] ==TRUE < 129.00 [°C] > 85.00 [%]	Test is evaluated after the enabling conditions are satisfied for a number of samples >=200.00 sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Throttle measured position			
					Outside air temperature	>-20.00 [°C]		
					Ambient air pressure	>69.60 [kPa]		
					LP EGR valve total mass error (absolute value, | desired LP EGR mass - estimated LP EGR mass|)	< 100.00 [mg]		
					Desired fuel quantity in range	> **P140B: Increasing HP EGR slow response Min fuel enabling condition** [mm^3] AND < **P140B: Increasing HP EGR slow response Max fuel enabling condition** [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND <350.00 [kPa]		
					Desired HP EGR flow gradient (Req-ReqOld) lower than a threshold	<2.00 [mg/s]		
					Desired HP EGR flow gradient (Req-ReqOld)	TRUE if > 1.40 [mg], FALSE if < 0.40 [mg]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					greater than a threshold, with hysteresis Hysteresis lasts for a limited number of samples HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis Desired HP EGR rate HP EGR valve position OR it is above that threshold for a time Exhaust manifold pressure is valid Nominal HP EGR valve total flow is valid Nominal LP EGR valve total flow is valid All enabling conditions last for a time	<= 45.00 [count] TRUE if > 35.00 [mg], FALSE if < 8.00 [mg] >7.00 [%] <= 55.00 [%] >=0.02 [s] EXM_ExhMnfdPresNotVld ==FALSE EGR_VlvTotFlowNomNotVid ==FALSE LPE_VlvTotFlowNomNotVld ==FALSE >= 0.05 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HP EGR Slow Response - Decreasing Flow (OBDII market only)	P140C	This monitor (in decreasing flow direction) detects failures in the air system such to not fulfilll the request of HP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the HP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the HP EGR flow slow response monitor is to detect small leakages in the pipe after the compressor or in the intake/exhaust manifold. This monitor could also detect slow responding HP EGR valve, or skewed MAF sensor. Slow responding throttle and VGT vanes could also affect the HP EGR flow response time.	Error difference (absolute value) between the desired HP EGR rate and the actual HP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P140C: Decreasing HP EGR slow response threshold [%]**	Calibration on diagnostic enabling	**P140B, P140C: HP EGR slow response enabling** ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]	>=200.00 sampling time is 25ms	
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Air control active condition lasts for a time	> 0.02 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	> 30.00 [°C] ==TRUE < 129.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Throttle measured position	> 85.00 [%]		
					Outside air temperature	>-20.00 [°C]		
					Ambient air pressure	>69.60 [kPa]		
					LP EGR valve total mass error (absolute value, | desired LP EGR mass - estimated LP EGR mass|)	< 100.00 [mg]		
					Desired fuel quantity in range	> **P140C: Decreasing HP EGR slow response Min fuel enabling condition** [mm^3] AND < **P140C: Decreasing HP EGR slow response Max fuel enabling condition** [mm^3]		
					Exhaust manifold pressure in range	> 70.00 [kPa] AND < 350.00 [kPa]		
					Desired HP EGR flow gradient (Req-ReqOld) greater than a threshold	> -1.35 [mg/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Desired HP EGR flow gradient (Req-ReqOld) lower than a threshold, with hysteresis	TRUE if < -1.30 [mg], FALSE if > -0.80 [mg]		
					Hysteresis lasts for a limited number of samples	<= 45.00 [count]		
					HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis	TRUE if < -30.00 [mg], FALSE if > -15.00 [mg]		
					Desired HP EGR rate	< 55.00 [%]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVId ==FALSE		
					Nominal HP EGR valve total flow is valid	EGR_VlvTotFlowNomNotVid ==FALSE		
					Nominal LP EGR valve total flow is valid	LPE_VlvTotFlowNomNotVId ==FALSE		
					All enabling conditions last for a time	> 0.02 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensori vs IAT2 (MAT) Not Plausible	P1428	The power up temperature varies too much from reference sensor after long soak. At start up, after a long enough soak time to stabilize temperatures, the EGR 1 temp sensor is compared to the MAT temp sensor. If the temperature delta is above an allowed operating threshold the sensor is determined to be faulted.	If the power up initial value of the temp sensor varies more than allowed from the reference temp sensor.	Temperature Delta from MAT. at power up > 20C	Diagnostic is	Enabled	NA	Type B, 2 Trips
					Engine soak (not run) time	>= 28,800.00 Sec		
					No P codes	P262B P0111 P0114 P010B P00E9 P117D P017C P017D P017B P117B P117F P117E P117C P0116 P0117 P0118 P111E P0128 P0119		
					Ignition switch	Crank or Run		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor A Reference Feedback Range/ Performance [For use on vehicles with FTZM]	P1434	This DTC will detect a fault in Primary fuel tank level sensor 5V reference by comparing DEC ECU commanded signal period and pulse width values against measured period and pulse width reported by the smart device	Reference Voltage 0 Period Error Maximum [Measured Ref V Period - Commanded Ref V Period]	> 25.00 millisec	a] CAN serial data available [$2D7] b] Calibration - Reference Voltage Command Source c] Timer - Reference Voltage Pulse Width Available Synchronization d] Timer - Reference Voltage Period Available Delay e] Diagnostic System Disabled f] FTZM Serial Data Info4 Rolling Counter Check Error g] Reference Voltage Performance 0 Diagnostic Enabled	a] == True b] == ECM c] > 1.25 sec d] > 0.75 sec e] <> True f] <> True g] ==TRUE	250 ms / sample	Type B, 2 Trips
			Reference Voltage 0 Pulse Width Error Maximum [Measured Ref V PW - Commanded Ref V PW]	> 1.50 millisec	a] CAN serial data available [$2D7] b] Calibration - Reference Voltage Command Source c] Timer - Reference Voltage Pulse Width Available Synchronization d] Timer - Reference Voltage Period Available Delay e] Diagnostic System Disabled	a] == True b] == ECM c] > 1.25 sec d] > 0.75 sec e] <> True	250 ms / sample 16 Failures/ 20 Samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					f] FTZM Serial Data Info4 Rolling Counter Check Error g] Reference Voltage Performance 0 Diagnostic Enabled	f] <>True g] == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 2 Not Plausible (Diesel L6 ATM)	P149A	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr The comparison sensors, temperature thresholds, and aux heater effects		Diagnostic is Enabled No Active DTC's Propulsion system Inactive timer error Sensor under diagnosis is not faulted Used comparison sensors are not currently faulted: - BiasChkCylHdCIntSnsr - BiasChkBlockClntSnsr - BiasChkEngInCIntSnsr - BiasChkEngOutCIntSnsr - BiasChkHtrCrInCIntSnsr - BiasChkHtrCrOutCInSnsr - BiasChkRadOutCIntSnsr - BiasChkBypInCIntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSn sr - BiasChk_EGR_DwnStmS	 OAT_PtEstFiltFA PSAR_PropSyslnactveCr s_FA = FALSE EECR_TS2_CktFA EECR_CylHeadCoolant_ CktFA EECR_BlockCoolant_Ckt FA EECR_Enginelnlet_CktFA EECR_EngineOutlet_Ckt FA EECR_HeaterCorelnlet_C ktFA EECR_HeaterCoreOutlet _CktFA EECR_RadiatorOutlet_Ck tFA EECR_Bypasslnlet_CktF A EECR_CylHeadMetal1_C ktFA IAT_SensorFA HumTempSnsrFA MnfdTempSensorFA OAT_AmbientSensorFA EngOilTempFA EGRTempSensorUPSS_F A	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			can be looked up by finding the location associated with the physical (Temperature) sensor number. **Engine Outlet:** CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B: **Engine Block:** CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkEngOutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1	12.25 °C 6.75 °C 20.60 °C 6.60 °C	nsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Metal:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Radiator Outlet:** Propulsion Off Soak Time Ambient Air Temperature	EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible > 21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Comparison sensor 1: CeEECR_e_BiasChkEng MetalSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OutClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Cylinder Head Metal A:** CeEECR_e_PhysSnsr8 Comparison sensor 1: CeEECR_e_BiasChkEng OutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrOutClnSnsr Comparison sensor 2: CeEECR_e_BiasChkRad OutClntSnsr Fuel Operated heater:	22.50 °C 7.25 °C 12.50 °C 6.75 °C	---------------- Comparison sensor 1 & 2 are not Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application:	= CeEECR_e_BiasChkNoS election Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrBlock ClntSnsr CeAEHR_e_BlkHtrRadO utClntSnsr >7.40 °C >21,600 seconds >21,600 seconds >-20.00 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkHtrCrlnCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngInCIntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkOutsideAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B:	12.67 °C 7.50 °C 12.67 °C 7.50 °C 16.46 °C 16.46 °C	2x2 signature Absolute Drop IAT Drop Temperature Derivative **2x2 Signature Criteria:** The warm sensors Sensor 1: Sensor 2: The cool sensors Sensor 1: Sensor 2: A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold) **Absolute Drop Criteria:** The is monitored for a drop. The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for	Enabled Enabled Disabled Disabled CeAEHR_e_BlkHtrEngOutCIntSnsr CeAEHR_e_BlkHtrEngMetalSnsr CeAEHR_e_BlkHtrRadOutCIntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr 5.0 °C 5.0 °C >10.0°C CeAEHR_e_BlkHtrBlockClntSnsr >87.00 L/min 0.1 - 17.0 seconds <77.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			A failure will be reported if any of the following conditions are met. Evaluated in order: 1) This sensor is above both comparison sensors 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	>A °C >A °C >B °C >B °C	A block heater is detected if a drop is **IAT Drop Criteria:** The sensor will be used as IAT for this method A block heater will be detected if: IAT has a drop of during a drive defined by: Drive time Vehicle speed Addtional drive time is provided when vehicle speed drops below above threshold as follows This detection method will abort if the engine is off OR Engine runtime **Temperature Derivative Criteria:** Derivative will be monitored using Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is	>1.8 °C CeAEHR_e_BlkHtrIntake AirSnsr >5.0 °C >400.0 seconds >24.0 kph 0.5 times the seconds with vehicle speed below the threshold above > 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrBlock ClntSnsr >-1.00 L/min 5.0 -15.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR Insufficent coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected =================	< 75.0 seconds <-0.10°C/sec > 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 5 Not Plausible (Diesel L6 ATM)	P149D	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr The comparison sensors, temperature thresholds, and aux heater effects		Diagnostic is Enabled No Active DTC's Propulsion system Inactive timer error Sensor under diagnosis is not faulted Used comparison sensors are not currently faulted: - BiasChkCylHdCIntSnsr - BiasChkBlockClntSnsr - BiasChkEngInCIntSnsr - BiasChkEngOutCIntSnsr - BiasChkHtrCrInCIntSnsr - BiasChkHtrCrOutCInSnsr - BiasChkRadOutCIntSnsr - BiasChkBypInCIntSnsr - BiasChkEngMetalSnsr - BiasChklntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSn sr - BiasChk_EGR_DwnStmS	OAT_PtEstFiltFA PSAR_PropSyslnactveCr s_FA = FALSE EECR_TS5_CktFA EECR_CylHeadCoolant_ CktFA EECR_BlockCoolant_Ckt FA EECR_Enginelnlet_CktFA EECR_EngineOutlet_Ckt FA EECR_HeaterCorelnlet_C ktFA EECR_HeaterCoreOutlet _CktFA EECR_RadiatorOutlet_Ck tFA EECR_Bypasslnlet_CktF A EECR_CylHeadMetal1_C ktFA IAT_SensorFA HumTempSnsrFA MnfdTempSensorFA OAT_AmbientSensorFA EngOilTempFA EGRTempSensorUPSS_F A	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			can be looked up by finding the location associated with the physical (Temperature) sensor number. **Engine Outlet:** CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B: **Engine Block:** CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkEngOutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1	 12.25 °C 6.75 °C 20.60 °C 6.60 °C	nsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Metal:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Radiator Outlet:** Propulsion Off Soak Time Ambient Air Temperature	EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible > 21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Comparison sensor 1: CeEECR_e_BiasChkEng MetalSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OutCIntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Cylinder Head Metal A:** CeEECR_e_PhysSnsr8 Comparison sensor 1: CeEECR_e_BiasChkEng OutCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrOutCInSnsr Comparison sensor 2: CeEECR_e_BiasChkRad OutCIntSnsr Fuel Operated heater:	22.50 °C 7.25 °C 12.50 °C 6.75 °C	---------------- Comparison sensor 1 & 2 are not Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application:	= CeEECR_e_BiasChkNoS election Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrBlock ClntSnsr CeAEHR_e_BlkHtrRadO utCIntSnsr >7.40 °C >21,600 seconds >21,600 seconds >-20.00 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrlnCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng InCIntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEng InCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkOut sideAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A: Threshold B:	12.67 °C 7.50 °C 12.67 °C 7.50 °C 16.46 °C 16.46 °C	2x2 signature Absolute Drop IAT Drop Temperature Derivative **2x2 Signature Criteria:** The warm sensors Sensor 1: Sensor 2: The cool sensors Sensor 1: Sensor 2: A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold) **Absolute Drop Criteria:** The is monitored for a drop. The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficent coolant flow is	Enabled Enabled Disabled Disabled CeAEHR_e_BlkHtrEngO utCIntSnsr CeAEHR_e_BlkHtrEngM etalSnsr CeAEHR_e_BlkHtrRadO utCIntSnsr CeAEHR_e_BlkHtrOutsid eAirSnsr 5.0 °C 5.0 °C >10.0°C CeAEHR_e_BlkHtrBlock CIntSnsr > 87.00 L/min 0.1 - 17.0 seconds <77.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			A failure will be reported if any of the following conditions are met. Evaluated in order: 1) This sensor is above both comparison sensors 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	>A °C >A °C >B °C >B °C	present for A block heater is detected if a drop is **IAT Drop Criteria:** The sensor will be used as IAT for this method A block heater will be detected if: IAT has a drop of during a drive defined by: Drive time Vehicle speed Addtional drive time is provided when vehicle speed drops below above threshold as follows This detection method will abort if the engine is off OR Engine runtime **Temperature Derivative Criteria:** Derivative will be monitored using Derivative will be monitored once coolant flow is AND Flow time is between AND either	>1.8 °C CeAEHR_e_BlkHtrIntake AirSnsr >5.0 °C >400.0 seconds >24.0 kph 0.5 times the seconds with vehicle speed below the threshold above > 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrBlock ClntSnsr >-1.00 L/min 5.0 - 15.0 seconds < 75.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine runtime is OR Insufficent coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected	<-0.10°C/sec > 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
LP EGR Slow Response - Increasing Flow (OBDII market only)	P14A5	This monitor (in increasing flow direction) detects failures in the air system such to not fulfill! the request of LP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the LP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the LP EGR flow slow response monitor is to detect small obstructions in the exhaust pipe. This monitor could also detect slow responding LP EGR valve, or skewed MAF sensor.	Error difference (absolute value) between the desired LP EGR rate and the actual LP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P14A5: Increasing LP EGR slow response threshold [%]**	Calibration on diagnostic enabling	**P14A5, P14A6: LP EGR slow response enabling** ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples	Type B, 2 Trips
					Engine Running	==TRUE		
					Cranking ignition in range	Battery voltage > 11.00 [V]	>= 200.00 sampling time is 25ms	
					PT Relay voltage in range	Powertrain relay voltage > 11.00 [V]		
					Air Control is Active (air control in closed loop)	Refer to "Air Control Active" Free Form		
					Air control active condition lasts for a time	> 0.02 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					(Engine Coolant Temperature	> 60.00 [°C]		
					OR			
					OBD Coolant Enable Criteria),	==TRUE		
					AND			
					Engine Coolant Temperature	< 129.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust Throttle measured position	> 60.00 [%]		
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					HP EGR valve total mass error (absolute value, | desired HP EGR mass - estimated HP EGR mass|)	< 75.00 [mg]		
					Desired fuel quantity in range	> **P14A5: Increasing LP EGR slow response Min fuel enabling condition** [mm^{A}3] AND < **P14A5: Increasing LP EGR slow response Max fuel enabling condition** [mm^{A}3]		
					LP EGR differential pressure in range	> 0.50 [kPa] AND < 2.90 [kPa]		
					Desired LP EGR flow gradient (Req-ReqOld) lower than a threshold	< 4.40 [mg/s]		
					Desired LP EGR flow gradient (Req-ReqOld)	TRUE if		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					greater than a threshold, with hysteresis	> 2.80 [mg], FALSE if < -0.50 [mg]		
					Hysteresis lasts for a limited number of samples	<= 8.00 [count]		
					LP EGR valve total mass error (desired LP EGR mass - estimated LP EGR mass) in range, with hysteresis	TRUE if > 36.00 [mg], FALSE if < 19.00 [mg]		
					Desired LP EGR rate	>4.00 [%]		
					LP EGR valve position OR it is above that threshold for a time	<= 60.00 [%] >= 0.02 [s]		
					No fault on Exhaust throttle valve position sensor	LEV_PstnSnsrFA ==FALSE		
					HP EGR valve total flow is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Nominal LP EGR valve total flow is valid	LPE_VlvTotFlowNomNotVld ==FALSE		
					All enabling conditions last for a time	>= 0.02 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
LP EGR Slow Response - Decreasing Flow (OBDII market only)	P14A6	This monitor (in decreasing flow direction) detects failures in the air system such to not fulfill! the request of LP EGR flow in the intake manifold during transient conditions. It works only in closed loop EGR control zone. This monitor is used to detect any malfunction in the LP EGR system that leads to slow down the air control causing the vehicle's emissions to exceed OBDII limits. The aim of the LP EGR flow slow response monitor is to detect small leakages in the pipe after the compressor or in the intake/exhaust manifold. This monitor could also detect slow responding LP EGR valve, or skewed MAF sensor.	Error difference (absolute value) between the desired LP EGR rate and the actual LP EGR rate during transient air control conditions. The error is averaged over a calibrate-able cumulative transient time.	> **P14A6: Decreasing LP EGR slow response threshold [%]**	Calibration on diagnostic enabling Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) Air control active condition lasts for a time Desired EGR rate No active transition from a combustion mode to another one (Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	**P14A5, P14A6: LP EGR slow response enabling** ==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form > 0.02 [s] > 0 [%] ==TRUE > 60.00 [°C] ==TRUE < 129.00 [°C]	Test is evaluated after the enabling conditions are satisfied for a number of samples >= 175.00 sampling time is 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust Throttle measured position	> 60.00 [%]		
					Outside air temperature	> -20.00 [°C]		
					Ambient air pressure	> 69.60 [kPa]		
					HP EGR valve total mass error (absolute value, | desired HP EGR mass - estimated HP EGR mass|)	< 75.00 [mg]		
					Desired fuel quantity in range	> **P14A6: Decreasing LP EGR slow response Min fuel enabling condition** [mm^3] AND < **P14A6: Decreasing LP EGR slow response Max fuel enabling condition** [mm^3]		
					LP EGR differential pressure in range	> 0.40 [kPa] AND < 2.80 [kPa]		
					Desired LP EGR flow gradient (Req-ReqOld) greater than a threshold	> -7.00 [mg/s]		
					Desired LP EGR flow gradient (Req-ReqOld)	TRUE if		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					lower than a threshold, with hysteresis	< -2.00 [mg], FALSE if > 0.50 [mg]		
					Hysteresis lasts for a limited number of samples	<= 8.00 [count]		
					LP EGR valve total mass error (desired LP EGR mass - estimated LP EGR mass) in range, with hysteresis	TRUE if < -55.00 [mg], FALSE if > -25.00 [mg]		
					Desired LP EGR rate	<6.00 [%]		
					No fault on Exhaust throttle valve position sensor	LEV_PstnSnsrFA ==FALSE		
					HP EGR valve total flow is valid	EGR_VlvTotFlowNotValid ==FALSE		
					Nominal LP EGR valve total flow is valid	LPE_VlvTotFlowNomNotVld ==FALSE		
					All enabling conditions last for a time	>= 0.02 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor B Not Plausible	P14C0	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngMetalHeadTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr The comparison sensors, temperature thresholds, and aux heater effects		Diagnostic is Enabled No Active DTC's Propulsion system Inactive timer error Sensor under diagnosis is not faulted Used comparison sensors are not currently faulted: - BiasChkCylHdCIntSnsr - BiasChkBlockClntSnsr - BiasChkEnglnCIntSnsr - BiasChkEngOutCIntSnsr - BiasChkHtrCrlnCIntSnsr - BiasChkHtrCrOutCInSnsr - BiasChkRadOutCIntSnsr - BiasChkBypInCIntSnsr - BiasChkEngMetalSnsr - BiasChklntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSn sr - BiasChk_EGR_DwnStmS	OAT_PtEstFiltFA PSAR_PropSyslnactveCr s_FA = FALSE EECR_CylHeadMetalB_C ktFA EECR_CylHeadCoolant_ CktFA EECR_BlockCoolant_Ckt FA EECR_Enginelnlet_CktFA EECR_EngineOutlet_Ckt FA EECR_HeaterCorelnlet_C ktFA EECR_HeaterCoreOutlet _CktFA EECR_RadiatorOutlet_Ck tFA EECR_Bypasslnlet_CktF A EECR_CylHeadMetal1_C ktFA IAT_SensorFA HumTempSnsrFA MnfdTempSensorFA OAT_AmbientSensorFA EngOilTempFA EGRTempSensorUPSS_F A	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			can be looked up by finding the location associated with the physical (Temperature) sensor number. Engine Outlet: CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterNoEffect Threshold A: Threshold B: Engine Block: CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkEngOutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngMetalSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: Engine Inlet: CeEECR_e_PhysSnsr1	12.25 °C 6.75 °C 20.60 °C 6.60 °C	nsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors The following thresholds are based on the sensor under diagnosis Engine Outlet: Propulsion Off Soak Time Ambient Air Temperature Engine Block: Propulsion Off Soak Time Ambient Air Temperature Engine Inlet: Propulsion Off Soak Time Ambient Air Temperature Head Metal A/B: Propulsion Off Soak Time Ambient Air Temperature Heater Inlet: Propulsion Off Soak Time Ambient Air Temperature Heater Outlet: Propulsion Off Soak Time Ambient Air Temperature Radiator Outlet: Propulsion Off Soak Time Ambient Air Temperature ================	EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible > 21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C >21,600 seconds >-20.0 °C = CeEECR_e_BiasChkNoSelection Same set as listed above and EngineModeNotRunTimerError EngineModeNotRunTimer_FA VehicleSpeedSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Comparison sensor 1: CeEECR_e_BiasChkEng MetalSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OutClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: Cylinder Head Metal A: CeEECR_e_PhysSnsr8 Comparison sensor 1: CeEECR_e_BiasChkEng OutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: Cylinder Head Metal B: CeEECR_e_PhysSnsr6 Comparison sensor 1: CeEECR_e_BiasChkEng OutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckClntSnsr Fuel Operated heater:	22.50 °C 7.25 °C 12.50 °C 6.75 °C 12.50 °C 6.75 °C 12.67 °C 7.50 °C	Comparison sensor 1 & 2 are not _______________ Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application: 2x2 signature Absolute Drop IAT Drop Temperature Derivative 2x2 Signature Criteria: The warm sensors Sensor 1:	CeAEHR_e_BlkHtrBlock ClntSnsr CeAEHR_e_BlkHtrRadO utClntSnsr >7.40 °C >21,600 seconds >21,600 seconds >-20.00 °C Enabled Enabled Disabled Disabled CeAEHR_e_BlkHtrEngO utClntSnsr CeAEHR_e_BlkHtrEngM etalSnsr CeAEHR_e_BlkHtrRadO utClntSnsr CeAEHR_e_BlkHtrOutsid eAirSnsr 5.0 °C 5.0 °C >10.0 °C CeAEHR_e_BlkHtrBlock ClntSnsr > 87.00 L/min 0.1 - 17.0 seconds <77.0 seconds >1.8 °C CeAEHR_e_BlkHtrIntake AirSnsr >5.0 °C >400.0 seconds >24.0 kph 0.5 times the seconds with vehicle speed below		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B: Heater Inlet: CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkHtrCrOutClnSnsr Comparison sensor 2: CeEECR_e_BiasChkRadOutClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: Heater Outlet: CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkHtrCrlnClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngInClntSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A:	12.67 °C 7.50 °C 16.46 °C 16.46 °C >A °C >A °C	Sensor 2: The cool sensors Sensor 1: Sensor 2: A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold) Absolute Drop Criteria: The is monitored for a drop. The drop will be monitored for once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for A block heater is detected if a drop is IAT Drop Criteria: A block heater will be detected if: IAT has a drop of during a drive defined by: Drive time Vehicle speed	the threshold above > 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrBlockClntSnsr >-1.00 L/min 5.0 -15.0 seconds < 75.0 seconds <-0.10°C/sec > 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Threshold B: Radiator Outlet: CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEng InCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkOut sideAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A: Threshold B: A failure will be reported if any of the following conditions are met. Evaluated in order: 1) This sensor is above both comparison sensors 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is below both comparison sensors and an aux heat	 >B °C >B °C	Addtional drive time is provided when vehicle speed drops below above threshold as follows This detection method will abort if the engine is off OR Engine runtime Temperature Derivative Criteria: Derivative will be monitored using Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR Insufficent coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected =================			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			source has not been detected to cause this skew					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Configuration Command Signal 1 Message	P14CD	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Configuration Command Signal 1.	The Fuel Tank Zone Module has determined that signal value of the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM) of Fuel Pump Driver Control Module Configuration Command Signal 1 Message transmitted by the Engine Control module is incorrect and sends a fail status back to the ECM for	>= 15.00 counts out of >= 16.00 counts	Diagnostic is enabled Message frame from the Fuel Tank Zone Module containing the diagnostic status is received All the following conditions are met for: Battery Voltage Sensor bus relay is on (if present)	Enabled >= 3,000.00 milliseconds >= 11.00 Volts	Samples every 15.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Configuration Command Signal 5 Message	P14D6	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Configuration Command Signal 5.	The Fuel Tank Zone Module has determined that signal value of the Alive Rolling Count (ARC), Protection Value (PV), or Checksum (CSUM)of Fuel Pump Driver Control Module Configuration Command Signal 5 Message transmitted by the Engine Control module is incorrect and sends a fail status back to the ECM for	>= 8.00 counts out of >= 10.00 counts	Diagnostic is enabled Message frame from the Fuel Tank Zone Module containing the diagnostic status is received All the following conditions are met for Battery Voltage Sensor bus relay is on (if present)	Enabled >= 3,000.00 milliseconds >= 11.00 Volts	Samples every 250.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Switch State Undertermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch “Data Invalid” (latched on/off switch architectures) or “Indeterminate” (momentary on/off switch architectures) is detected for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 3.0 seconds	Diagnostic is enabled.		fail continuously for greater than 3.0 seconds	Type C, No SVS, "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set/ Coast Signal 2 Circuit	P155B	Detects a failure of the cruise set 2 switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit voltage is stuck in Decrease High state for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with the secondary cruise switch circuit.	Cruise Control Set 2 switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume/ Acceleration Signal 2 Circuit	P155C	Detects a failure of the cruise resume 2 switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit voltage is stuck in Increase High state for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with the secondary cruise switch circuit.	Cruise Control Resume 2 switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Feedback Circuit High Voltage	P157A	Detects unexpected CAN activity on the sensor bus. This diagnostic reports the DTC when controller-specific CAN frames are received while the sensor bus relay is commanded "off."	Continued reception of sensor bus CAN frames during driver off state indicates a stuck on circuit failure. Controller specific received CAN frames are selected to determine continued CAN activity.		Sensor Bus Relay feedback circuit high voltage diagnostic enabled Sensor Bus Relay commanded “OFF” No Sensor Bus active DTCs:	= 1 P16D7, P16D8, P16D9	6 failures out of 10 samples 250ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Lane Center Switch Circuit	P1589	Detects failure for cruise lane centering control circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit voltage is stuck in the LCC (Lane Centering Control) state for too long, ECM sets the code and adaptive cruise control will be disabled and disengaged for the remainder of the key cycle. Only applicable for applications with the secondary cruise switch circuit.	Lane Center Control switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Wheel Speed Sensor Sequence Number Incorrect	P15FD	This DTC monitors wheel speed signals for an incorrect sequence	Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect. A complete set of sequence numbers has not been received for and this state is continuous for out of a total sample time of	> 10.00 seconds >4.00 seconds > 5.00 seconds	Sequence Number Error DTC is enabled Power Mode Run/Crank Ignition Voltage Driven and non-driven wheel rotational status is currently being received and not failsoft.	Enabled = Run or Crank >=11.00 Volts	Diagnostic executes in 25ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Secondary Transmission Range Selector Position Message Sequence Number Incorrect	P15FE	Coherency number is a four-bit rolling counter appended to the CAN data frames as time stamps. Every time a newer and more updated version of a CAN frame is sent, the rolling counter is incremented by one. After 15 it restarts from 0. For safety and redundancy, each of the X and Y position sensor data is sent over two CAN buses in two CAN buses at the same time. Since CAN transmission is not perfectly synchronized, at the receiver side the parallel streams of arriving CAN frames are compared. When two CAN frames are compared, if the coherency numbers are different by more than 2 counts, then this DTC is set. If not, then the two CAN data streams are aligned with each other to be in time synch at the receiver side.	The coherency numbers on the two CAN frames arriving in two CAN buses differ by more than OR: the four-bit coherency sequence of one of the CAN frames is:	2 counts Unable to be aligned due to repeat values	Diagnostic enabling calibration: Reception of data through secondary bus is: Run/Crank Active Signal	1.00 Enabled Run or Crank	An X out of Y scheme is used: Fail counter threshold = 20.00 Sample counter threshold = 25.00	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Pressure Regulator 1 Control Performance	P163A	This diagnostic checks for internal failures of the Fuel Metering Unit valve driver.	Fuel Metering Unit valve Driver Status OR Fuel Metering Unit valve Driver Status	== *Failed* == *Not Initialized* for at least 10.00 consecutive samples	Powertrain relay voltage Engine cranking Run crank active	> 11.0V == FALSE ==TRUE	31.00 failures out of 62.00 samples 12.5 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Pressure Regulator 2 Control Performance	P163B	Determine when commanded current for Rail Pressure Regulator valve is out of expected current range.	Current flowing through pressure regulator valve OR Current flowing through pressure regulator valve	>2.30 A <0.05 A	Powertrain relay voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntrl)* No active DTC since key is on:	> 11.0V FHP_PR_DrvrCloseTFTK 0 FHP_PR_DrvrOpenTFTK 0	121.00 failures out of 242.00 samples 6.25 ms/sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage. The diagnostic monitors the difference in voltage between Run/Crank Voltage and the Powertrain Relay Ignition Voltage and fails the diagnostic when the voltage difference is too high. This diagnostic only runs when the powertrain is commanded on and the Run/Crank Voltage is greater than a threshold based on IAT or the powertrain ignition voltage is high enough the Run/Crank voltage is high enough.	|Run/Crank - PT Relay Ignition) >	3.00 Volts	Powertrain Relay commanded on AND (Run/Crank voltage > OR PT Relay Ignition voltage >) AND Run/Crank voltage >	 Table, f(IAT). See supporting tables: **P1682 PT Relay Pull-in Run/Crank Voltage f(IAT)** 5.50 Volts 5.50 Volts	240/480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Voltage Correlation #3	P16BC	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2	|Run/Crank - PT Relay Ignition) >	3.00 Volts	Powertrain Relay commanded on AND (Run/Crank voltage > OR PT Relay Ignition voltage >) AND Run/Crank voltage >	 Table, f(IAT). See supporting tables: **P16BC_PT Relay Pull-In Run/Crank Voltage f(IAT)** 5.50 Volts 5.50 Volts	240/480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit Open	P16D7	Detects an open circuit in the sensor bus relay circuit. This diagnostic reports the DTC when an open circuit is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: > 200 K Q ohms impedance between output and controller ground	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P16D8 may also set (Sensor Bus Relay Control Circuit Low).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit Low	P16D8	Detects a short to ground in the sensor bus relay circuit. This diagnostic reports the DTC when a short to ground is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to ground: < 0.5 Q impedance between output and controller ground	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P16D7 may also set (Sensor Bus Relay Control Circuit Open).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Sensor Bus Relay Control Circuit High	P16D9	Detects a short to power in the sensor bus relay circuit. This diagnostic reports the DTC when a short to power is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: < 0.5 Q impedance between output and controller power	Run/Crank Voltage	Voltage > 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Transmission Range Control Performance	P16F4	Determines if the Electronic Transmission Range Select control module software incorrectly processes a range request which would result in an unsafe condition	Driver Requested Arbitrated Range Commanded OR: Transmission range control routine Transmission range control routine Transmission range control routine	is issued unexpectedly OR + expected range Does not issue Park or Neutral command quickly enough in response to driver request Issues a request to Drive, Low or Manual without a matching input by the customer within a calibrated time T1. Issues a request to Reverse without a matching input by the customer within a calibrated time limit T2.	TRCR Global Diagnostic Enable CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup cal value must be =6 to enable the type B DTC:	= True =False =False =True = True =True =Park =False 6.00	200, 200, 200,2,050, 200 or 200 msec, depending on conditions. T1 = 200 msec T2 = 200 msec	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unexpected Range Change Detected	P1787	Detects an unexpected change in transmission range.	Actual Arbitrated Transmission Range The internal system only diagnoses range changes in and out of Park.	± Previous Value and # Commanded Range	Actual Tranmission Range Range Change Achievement Diag cal must be =6 to enable a type B DTC:	= Valid Range = Not running 6.00	1,500 ms	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Current Transmission Range Unknown	P1789	Detects the failure of the ETRS system to identify the current transmission range with sufficient confidence.	Actual Transmission Range	= Undefined	Range Indication Source AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup cal must be =6 to enable a type B DTC:	= Valid =False =False =True = True =True =Park =False 6.00	80 failures out of 100 samples 12.5 ms loop	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A Circuit Low	P17A3	Detects Selector Enable Switch A circuit reading low	Shift Enable Switch Measured Voltage Percent	< Low 446 counts 1023 counts = 5 Volts	The enabling calibration must be set to 6 to enable a type B DTC:	3.00	16 Failures out of 20 Samples (5 msec loop)	Emissions Neutral Diagnostics - Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A Circuit High	P17A4	Detects Selector Enable Switch A circuit reading high	Selector Enable Switch Measured Voltage Percent	> High = 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	The enabling calibration must be set to 6 to enable a type B DTC:	3.00	16 Failures out of 20 Samples (5 msec loop)	Emissions Neutral Diagnostics - Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A Circuit Performance	P17A5	Detects Selector Enable Switch A circuit reading outside "Released" or "Pressed" values	Selector Enable Switch Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Not Fault Active The enabling calibration must be set to 6 to enable a type B DTC:	P17A4, P17A3 3.00	100 Failures out of 120 Samples =500 msec (5 msec loop)	Emissions Neutral Diagnostics - Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch A/B Correlation	P17A6	Correlation diagnosic compares both switches	Measured Voltage Percent of Selector Enable Switch A and Switch B	Are both VALID, (Release or Pressed), but disagree. Pressed: 49% -61% Released: 70% -82%	Interlock comparison diagnostic enabling calibration = The controller has been awake for at least: The enabling calibration must be set to 6 to enable a type B DTC:	1.00 =0.05 seconds 3.00	12.5 ms rate 24,000.00 failures out of 24,000.00 samples	Emissions Neutral Diagnostics - Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch B Circuit Low	P17A7	Detects Selector Enable Switch B circuit reading low	Selector Enable Switch Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts. 1023 Counts = 5 V	The enabling calibration must be set to 6 to enable a type B DTC	3.00	16 Failures out of 20 Samples (5 msec loop)	Emissions Neutral Diagnostics - Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch B Circuit High	P17A8	Detects Selector Enable Switch B circuit reading high	Selector Enable Switch Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	The enabling calibration must be set to 3 to enable a type C DTC:	3.00	16 Failures out of 20 Samples (5 msec loop)	Emissions Neutral Diagnostics - Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Enable Switch B Circuit Performance	P17A9	Detects Selector Enable Switch B circuit reading outside "Released" or "Pressed" values	Selector Enable Switch Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	Not Fault Active The enabling calibration must be set to 6 to enable a type B DTC:	P17A8, P17A7 3.00	100 Failures out of 120 Samples =500 msec (5 msec loop)	Emissions Neutral Diagnostics - Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high or 4WD low command not 4wd high or 4WD low ratio	P17D4	The diagnostic monitor compares measured transfer case ratio to the transfer case control module commanded transfer case state. When the measured transfer case gear ratio is 4WD neutral ratio, while, the transfer case control module command state is 4WD high ratio or 4WD low ratio, the DTC is set. The 4WD neutral ratio regions are considered ratios outside the nominal 4WD high and nominal 4WD low ratios. The 4WD ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is NOT in 4WD low ratio window AND measured transfer case ratio is NOT in 4WD high window AND measured transfer case ratio is NOT in 4WD low ratio window AND measured transfer case ratio is NOT in 4WD high window OR vehicle is stopped: transfer case output shaft speed transmission output shaft speed vehicle stopped secondary parameter thresholds met (measured transfer case ratio = transmission output speed / transfer case output speed)	# 4WD neutral 4WD low ratio window < 3.00 > 2.40 4WD high ratio window <1.30 > 0.70 > 2.90 < 2.00 > 1.20 < 0.80 < 10.0 RPM > 500.0 RPM	vehicle stopped: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	> 500.0 RPM > 15.0 Nm > 300.0 RPM > 5.0 % hysteresis high NOT < 3.0 % hysteresis low < 100.0 % > 500.0 RPM > -20.0 Nm > 0.0 RPM > 0.0 % hysteresis high NOT < 0.0 % hysteresis low < 100.0 % > 500.0 RPM > 90.0 Nm > 300.0 PRM > 6.0 % hysteresis high NOT < 3.0 % hysteresis low < 100.0 % = 1.00 Boolean = FALSE = FALSE P057B, P057C, P057D, P057E, P279A, P279B, P279C, P0502, P0503, P0722,	fail count > 840.00 counts out of sample count > 1,200.00 counts update rate 12.5 milliseconds for 1 count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			update rate 12.5 milliseconds			P0723, P2160, P2161		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Memory Checksum Error	P17D8	[1] This DTC will be stored if any software or calibration check sum is incorrect. [2] Circuit Monitor mismatch occurs	[1] Calculated Checksum [2] Switch circuit calculated values:	± stored checksum for any of the parts (boot, software, application calibration, system calibration) ± switch circuit monitor values	Ignition OR Accessory The enabling calibration must be set to 5 to enable a type A DTC:	Run or Run/Crank ON 5.00	[1] 1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background [2] Test runs during calculation of switch circuit values	Type A one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Read Only Memory (ROM) Error	P17D9	Reports a failure if the BIST (=Built in Self Test) for [1] the ROM checksum or [2] the ROM Error correcting code (ECO) check fails.	[1] Checksum at power-up [2] ROM ECC	+ checksum at power-down = fault	Ignition OR Accessory: The enabling cal must be set to 5 to enable a type A DTC:	Run or Run/Crank ON 5.00	[1] 1 failure Frequency: Once at power-up [2] 1 failure Frequency: Runs continuously in the background	Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Internal Random Access Memory (RAM) Error	P17DA	Indicates that control module is unable to correctly write and read data to and from RAM.	Data read	# Data written	Ignition: OR Accessory The DTC enabling calibration must be set to 5 to enable a type A DTC:	Run or Run/Crank ON 5.00	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures This test runs continuously in the background	Type A one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Processor	P17DB	Indicates the ECU has detected an internal processor fault. This DTC is dependent on the microprocessor and includes self testing not listed. [1] Microprocessor ALU Integrity Diagnostic Monitor Algorithm [2] Main Processor Configuration Register Test [3] Seed and Key fault (Set by ECM when seeds and keys do not match) [4] Stack overflow [5] Program Counter Exception Error [6] Watchdog Fails to reset	[1] Calculated key from rolling seed [2] Processor register [3] <This test has no threshold value.> [4] Unused stack memory above maximum stack used [5] Illegal instruction loaded into program counter [6] Set when a fault that should cause a reset fails to cause a reset.	[1] # expected key [2] ± expected processor register value [3] No threshold value [4] # initialized special pattern [5] No threshold value [6] No threshold value	For all six cases: Ignition Accessory The enabling calibration must be set to 5 to enable a type A DTC:	For all six cases: Run or Run/Crank OR ON 5.00	[1] 1 failure Test runs continuously (20ms loop or less) [2] 1 failure Test runs continuously (20ms loop or less) [3] 1 failure Test runs continuously (25ms loop or less) [4] 1 failure Test run by OS on task switches [5] 1 failure [6] 1 failure	Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Ignition On/ Start Switch Circuit Low	P17E0	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/ CRANK	4.5 sec in 5.5 second window	Type B two trips
					The enabling cal must be set to 6 to enable a type B DTC:	6.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Ignition On/ Start Switch Circuit High	P17E1	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7V	Engine Controller Run Crank Terminal Status - CAN Message Enabling cal must be =6 to enable type B DTC:	= 0, indicating NOT RUN/CRANK 6.00	8 sec in 10 second window	Type B two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Switch "A" Circuit High	P17E3	The Transmission Range Selector Switch "A" Diagnostic detects a reading High	Transmission Range Selector Switch "A" Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	The enable calibration for this DTC must be set to 6 to enable a type B DTC:	6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Switch "A" Circuit Low	P17E4	Transmission Range Selector Switch "A" Diagnostic detects a reading Low	Transmission Range Selector Switch "A" Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts 1023 counts = 5 Volts	The enabling calibration must be set to 6 to enable a type B DTC:	6.00	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Position Switch A/B Circuit Stuck Off	P189D	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states	[1] The number of Park button Press AND Switch-1-Closed count AND Switch-2-Closed count	>=8.00 <= 0.08* 8.00 >=0.80* 8.00	Not Fault Active Controller is on Park button switch signals: Vehicle Speed Comprehensive correlation diagnostics: Cal must be =6 to enable a type B DTC:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 . =True* 6.00	This is based on the number of button and switch activation, not time. *note: these samples can accumulate over key-cycles	DTC Type B, Two trips. MIL is set on the second occurrence of the fault.
			1] The number of Park button Press AND Switch-1-Closed count AND Switch-2-Closed count	>=8.00 >= 0.80* 8.00 <=0.08* 8.00	Not Fault Active Controller is on Park button switch signals: Vehicle Speed Comprehensive correlation diagnostics: Cal must be =6 to enable a type B DTC:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 . =True* 6.00	This is based on the number of button and switch activation, not time. *note: these samples can accumulate over key-cycles	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit / Open Bank 1 Unit 1	P2047	This diagnosis verifies if a DEF dosing valve open circuit occurred	HWIO interface DEFMVJDPEN = Fault	VeHWIO_e_DEFMV_Open == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_OPEN different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit Low Bank 1 Unit 1	P2048	This diagnosis verifies if a DEF dosing valve low side short to ground occurred	HWIO interface DEFMV_GROUND_SHORT = Fault	VeHWIO_e_DEFMV_Gsht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_GROUND_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Circuit High Bank 1 Unit 1	P2049	This diagnosis verifies if a DEF dosing valve low side short to battery occurred	HWIO interface DEFMV_POWER_SHORT = Fault	VeHWIO_e_DEFMV_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV_ENABLE_POWER_SHORT different from INDETERMINATE	1.00 > 11.00 [V]	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SCR NOx Catalyst Efficiency Below Threshold Bank 1 Catalyst 1 - EWMA Enabled	P20EE	The diagnosis checks if there is a malfunction in the SCR1 (SCRF) NOx conversion system measuring its NOx conversion efficiency. SCR1 NOx conversion efficiency is evaluated by two NOx sensors (upstream & downstream SCR1, also defined as NOx#1 and NOx#2 respectively). Considering that NOx sensors are cross-sensitive (they measure both NOx and NH3), NOx#2 will be affected by NH3 at SCR1 outlet. The monitoring is executed by comparing SCR1 measured NOx conversion efficiency and SCR1 reference efficiency: - Measured NOx conversion efficiency is calculated as q_Eff_SCR1 _Msrd = 1 - [f NOx_SCRI _Dwn_Msrd /J NOx SCR1 _Up_Msrd]	EWMA filtering is applied to the difference between measured SCR1 NOx conversion efficiency (r|_Eff_SCR1_Msrd) and reference one (q_Eff_SCR1_Ref)	Fail threshold is = 0, Repass threshold is = 0	Test enabled by calibration; No active DTCs; Debounce time elapsed after SCR chemical model is healed; Diagnostic system not disabled; Test not yet executed on current key cycle except the case where EWMA filtering is in Rapid Response (RR) or Fast Initial Response (FIR) state; Tests per trip up to calibratable value when EWMA filter is in Fast Initial Response (FIR) state; Total tests executed in Fast Initial Response (FIR) state up to calibratable value;	CalOut = 1 [Boolean]; # NOX_Snsr1_NOx_Flt ≠ NOX_NOx_SnsrSCR_DwnFlt + EGT_TempSCR_UpFlt # EGP_PresSCR_UpFlt # EXF_TotExhSCR_UpFlt # SCR_RDP_Flt # SCR_TipStuckFltSt *t* SCR_DEFMV_FA ≠ SCR_ChemicalMdlFlt; Debounce = 100 [s]; NotDsbl = True [Boolean]; NotRun = True [Boolean]; FIR test trip < 1; FIR tot tests < 2;	One failure to set the DTC.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		- Reference efficiency is evaluated as q_Eff_SCR1_Ref = 1-[I NOx_SCRI Dwn Ref/ J NOxUpSCRIMsrd] NOx_SCR1_Dwn_Ref is calculated as NOx_SCR1_Dwn_Ref = NOx_SCRI _Up Msrd * (1- (SCR1_eff_estimated - offset)) SCR1_eff_estimated comes from SCR1 chemical model and it takes into account the estimated amount of NOxand NH3 at SCR1 outlet: SCR1_eff_estimated = 1 - (NOx_SCR1_Dwn_est +NH3SCR1_Dwn_est) / NOx_SCRI _Up_Msrd			Tests per trip up to calibratable value when EWMA filter is in Rapid Response (RR) state; Total tests executed in Rapid Response (RR) state up to calibratable value; DEF system ready to inject; Urea inside the tank not frozen; Debounce time elapsed after DEF defrost has been completed; Engine torque request higher than calibration; Rate of change of estimated efficiency (from SCR1 catalyst model) less than or equal to a calibratable value; Debounce time elapsed after condition based on rate of change of estimated efficiency is met; Upstream SCR1 NOx sensor measurement reliable; Downstream SCR1 NOx sensor measurement	RR test trip < 1 ; RR tot tests < 4 ; DEF ready = True [Boolean]; DEF tank status = DEF_TankNotFrozen [Enumerative]; Debounce = 0 [s]; Torque >= 50 [Nm]; |Rate of change of estimated efficiency! <= 1 [-] Debounce = 2 [s]; Reliable = True [Boolean]; Reliable = True [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This allows being aligned to cross-sensitive NOx sensor #2. The offset **(K_EffOffset)** is calibrated in order to detect a malfunction. Test is performed when NOx integral upstream SCR1 reaches 1,000.00 [mg]. Use this section if EWMA filter is enabled (1.00 == 1 [Boolean]).			reliable; Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (SCR1 catalyst de-greened); SCR service bay test not active; Debounce time elapsed after exiting from SCR service bay test; Outside ambient temperature higher than calibration with hysteresis; Ambient pressure higher than calibration with hysteresis; Urea dosing activation by SCR1 mean temperature condition; Debounce time elapsed after urea dosing activation by SCR1 mean temperature becomes true; Difference between SCR1 upstream and SCR1 downstream temperatures: - higher than first calibration curve	 DPF Rgn Compt > 1 [-]; Service Bay Test == ServNotRunning [Enumerative]; Debounce = 0 [s]; OAT > -20 [°C]; -20 [°C] < hysteresis range < -20 [°C] Pressure > 72 [kPa]; 70 [kPa] < hysteresis range < 72 [kPa] SCR1 mean temperature > 185 [°C]; 180 [°C] < hysteresis range < 185 [°C] Debounce = 100 [s]; SCR1 up/down diff temperature > **TMinTempGrad** [°C] Temperature <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(f[SCR1 mean temperature]) AND - lower than second calibration curve (f[SCR1 mean temperature]);	**T MaxTempGrad** [°C];		
					Debounce time elapsed after condition based on temperature gradient is met;	Debounce = 5 [s];		
					Exhaust mass flow and SCR1 average temperature within calibratable limits defined by 2 size table (f[exhaust mass flow, SCR1 average temperature]), enabled if table output is greater than calibration;	**K_EffExhFlowCond >** 1 [-];		
					Debounce time elapsed after condition based on exhaust mass flow and SCR1 average temperature is met;	Debounce = 5 [s];		
					SCR1 mean temperature time derivative within limits defined by maximum and minimum calibrations and debounce time elapsed based on following logic: - while SCR1 mean temperature time derivative is outside the limits, the system continuously evaluates the debounce time based	-3 < Delta temperature < 3 [°C/sec]; Debounce = **t_DerTempDsblTmr** [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on calibration curve (f[SCR1 mean temperature time derivative]) and records the maximum value; - instead when SCR1 mean temperature time derivative gets within the limits, countdown starts until debounce time has been reached;			
					Upstream SCR1 NOx flow measurement lower than calibration and debounce time elapsed based on following logic: - while SCR1 NOx flow measurement higher than calibration, the system continuously evaluates the NOx average flow; - instead when SCR1 NOx flow measurement gets lower than calibration, debounce time based on calibration curve (f[NOx average flow, time spent with NOx flow higher than calibration]) is evaluated and countdown starts until debounce time has been elapsed. Limitation on the debouce time is always applied;	NOx up flow < 75 [mg/s]; Debounce = **t_NOxFlowIncDsblTmr** [sec]; Max debounce = 30 [s];		
					Upstream SCR1 NOx flow measurement higher than calibration;	NOx up flow > 2 [mg/s];		
					Upstream SCR1 NOx	NOx up > 125 [ppm];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor measurement higher than calibration;			
					Upstream SCR1 NOx sensor measurement lower than calibration;	NOx up < 1,000 [ppm];		
					Downstream SCR1 NOx sensor measurement higher than calibration;	NOx dwn > -1 [ppm];		
					Upstream SCR1 absolute NOx flow derivative lower than calibration;	Delta NOx up flow < 25 [mg/s^2];		
					NO2/NOx ratio: - higher than first calibratable value AND - lower than second calibratable value;	NO2/NOX > 0 [-] NO2/NOX < 1 [-];		
					Debounce time elapsed after all NOx conditions (except upstream SCR1 NOx flow measurement lower than calibration) become true;	Debounce = 1 [s];		
					Estimated NH3 slip downstream SCR1 lower than a calibration;	Estimated NH3 slip < 75.00 [ppm];		
					Debounce time elapsed after estimated NH3 slip condition is met;	Debounce = 5.00 [s]		
					NH3/NOx ratio upstream SCR1 lower than a calibration;	NH3/NOx ratio SCR1 up < 5.00 [-];		
					Debounce time elapsed	Debounce = 5.00 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					afetr NH3/NOx ratio condition is met;			
					DPF / DeHC combustion modes not active;	Cmb # DPF_HiO2 | DPF_LoO2 | DPF_EngPrtct_HiO2 | DPF_EngPrtct_LoO2 | DPF_PN | DPF_RichIdle | DeHCJDrive | DeHC_Park [Enumerative];		
					Debounce time elapsed after exiting from DPF / DeHC combustion modes;	Debounce = 60 [s];		
					NH3 storage deviation error of SCR1 (difference between storage estimation and storage set-point): - higher than first calibration curve (f[SCR1 average temperature]) AND - lower than second calibration curve (f[SCR1 average temperature]);	NH3 deviation > **m_NH3_StrgDevErrMinThrsh** [g] NH3 deviation < **m_NH3_StrgDevErrMaxThrsh** [g];		
					NH3 storage of SCR1: - higher than first calibration curve (f[SCR1 average temperature]) AND - lower than second calibration curve (f[SCR1 average temperature]);	NH3 storage > **m_NH3_StrgMinThrsh** [g] NH3 storage < **m_NH3_StrgMaxThrsh** [g];		
					Debounce time elapsed after condition based on NH3 storage deviation error and NH3 estimated	Debounce = 5 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					storage is met; SCR dosing in NH3 storage control or in intrusive NH3 storage control; Debounce time elapsed after switching to NH3 storage control or intrusive NH3 storage control; Diesel Exhaust Fluid quality measurement (concentration read by DEF quality sensor) higher than calibration with hysteresis (condition active only if DEF quality sensor is available);	 Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 10 [s]; DEF concentration > 30 [Pct]; 29 [Pct] < hysteresis range < 30 [Pct] DEFQS present= 1 [Boolean];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor.	APP1 percent Vref < (100% corresponds to 5.0 Volt)	9.25 %Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detects a continuous or intermittent short high in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #1 on the Main processor.	APP1 percent Vref > (100% corresponds to 5.0 Volt)	95.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short low or open in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #2 on the Main processor.	APP2 percent Vref < (100% corresponds to 5.0 Volt)	6.50 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detects a continuous or intermittent short high in the APP sensor #2 by monitoring the APP2 sensor percent Vref and failing the diagnostic when the APP2 percent Vref is too high. This diagnostic only runs when battery voltage is high enough. Detect a continuous or intermittent short high in the APP sensor #2 on the Main processor.	APP2 percent Vref > (100% corresponds to 5.0 Volt)	52.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detect a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between APP1 and the APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic also monitors the difference in reference voltage between normalized min APP1 and the normalized min APP2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	Difference between APP1 displaced and APP2 displaced > (100% corresponds to 5.0 Volt)	5.000 % offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst for # 3 & # 4 5V reference circuits	> 6.41 Volts (P2122, P2123,P2127, P2128) (P06A3, P0697)	19/39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min APP1) and (normalized min APP2) > (100% corresponds to 5.0 Volt)	3.500 % Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst for # 3 & # 4 5V reference circuits	>6.41 Volts (P2122, P2123,P2127, P2128) (P06A3, P0697)	19/39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 2 Circuit Low (Diesel L6 ATM)	P2184	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8:	< X Ohms X is equal to: Temp Sensor 1: 49 Ohms Temp Sensor 2: 48.8 Ohms Temp Sensor 3: 43.2 Ohms Temp Sensor4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 6: 62.3 Ohms Temp Sensor?: 48.8 Ohms Temp Sensor 8: 62.3 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 2 Circuit High (Diesel L6 ATM)	P2185	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5	> X Ohms X is equal to: Temp Sensor 1: 230,546 Ohms Temp Sensor 2: 230,546 Ohms Temp Sensor 3: 338,540 Ohms Temp Sensor4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 6: 380,707 Ohms Temp Sensor 7: 230,546 Ohms Temp Sensor 8: 380,707 Ohms	Diagnostic is Enabled Engine run time OR IAT min	 > 10.0 seconds > -20.0 °C	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 2 Circuit Intermittent/ Erratic (Diesel L6 ATM)	P2186	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt		Diagnostic is Enabled No Active DTC's	 EECR_TS2_Erratic_TFTK 0 EECR_TS2_CktHiLo_FA	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The calculated high and low limits for the next reading use the following calibrations: Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 3.1 seconds -60.0 °C 150.0 °C 2.4 seconds -60.0 °C 150.0 °C 3.6 seconds -60.0 °C 150.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 4.0 seconds -60.0 °C 250.0 °C 3.4 seconds -60.0 °C 150.0 °C 4.0 seconds -60.0 °C 250.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Performance (3 intake air pressure sensor configuration)	P2227	This monitor is used to identify BARO sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running). If the BARO sensor value is within the normal expected atmospheric range, then MAP, TCIAP and BARO are compared to see if their values are similar. If the MAP and TCIAP sensor values are similar, but the BARO value is not similar, then a BARO performance diagnostic will fail. If BARO sensor is not in agreement with the other two the monitor is able to pinpoint BARO as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor	> **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crankrelay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA ==FALSE	480.00 fail counters over 600.00 sample counters sampling time is 12.5 ms for applications without LIN MAF sampling time is 25 ms for applications with LIN MAF	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Low (Diesel, pull-down)	P2228	Detects a continuous short to ground or open circuit in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	< 10.0% of 5 Volt Range (This is equal to 40.0 kPa)	Diagnostic is Enabled		240 failures out of 300 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit High (Diesel, pull-down)	P2229	Detects a continuous short to power in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	> 84.0% of 5 Volt Range (This is equal to 114.0 kPa)	Diagnostic is Enabled		240 failures out of 300 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected. When the value of BARO in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO readings. The result of this summation is called a “string length”. Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	> 100 kPa 80 consecutive BARO readings	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Water in Fuel Condition (Digital/ Passive, Wired to FTZM)	P2269	Determine fuel filter sensor detect water.	Water in fuel sensor output	< 2.0 V (Water present)	Powertrain relay voltage Ignition on time Sensor Bus Relay commanded on FTZM supply voltage No active DTC:	> 11.0V > 15.00s >8.0V P1103 SBRRlyFA	40 failure out of 80 samples 100 ms/sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Inlet Pressure (TCIAP) Sensor Performance (3 intake air pressure sensor configuration)	P227B	This monitor is used to identify TCIAP sensor internal faults (measurement with an offset or a drift). The plausibility monitor compares the BARO, MAP and TCIAP pressures in two different conditions: - at idle (part of the test enabled when the engine is running) - between key off and when the engine starts running (part of the test enabled when the engine is not running) If the TCIAP sensor value is within the normal expected atmospheric range, then MAP, TCIAP and BARO are compared to see if their values are similar. If the MAP and BARO sensor values are similar, but the TCIAP value is not similar, then a TCIAP performance diagnostic will fail. If TCIAP sensor is not in agreement with the other two the monitor is able to pinpoint TCIAP as the faulty sensor.	Difference (absolute value) in measured pressure between BARO sensor and TCIAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between BARO sensor and MAP sensor	> **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P1199: Maximum pressure difference** [kPa]	Correlation diagnostic enabled by calibration Engine is running Run Crank relay supply voltage in range Engine speed Requested fuel Throttle measured position Engine Coolant Temperature No faults are present	==1.00 > 11.00 [V] < 950.00 [rpm] < 40.00 [mm^3] > 90.00 [%] > 70.00 [°C] CrankSensor_FA ==FALSE FUL_GenericInjSysFA ==FALSE TPS_PstnSnsrFA ==FALSE MAP_SensorCircuitFA ==FALSE AAP2_SnsrCktFA ==FALSE AAP_AAP5_SnsrCktFA ==FALSE AAP_AAP2_SnsrStabFA ==FALSE AAP_AAP5_SnsrStabFA	480.00 fail counters over 600.00 sample counters sampling time is 12.5 ms for applications without LIN MAF sampling time is 25 ms for applications with LIN MAF	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						==FALSE ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor Circuit C Low (Diesel, applications with LIN MAF)	P227C	Detects an eroneously low value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO C Pressure	< 45.0 kPa	Diagnostic is Enabled LIN Communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor Circuit C High (Diesel, applications with LIN MAF)	P227D	Detects an eroneously high value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO C Pressure	> 115.0 kPa	Diagnostic is Enabled LIN Communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic (applications with LIN MAF)	P227E	Detects a noisy or erratic signal in the barometric pressure (BARO) C circuit by monitoring the BARO C sensor and failing the diagnostic when the BARO C signal has a noisier output than is expected. When the value of BARO C in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO C readings. The result of this summation is called a “string length”. Since the BARO C signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO C signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO C reading - BARO C reading from 25 milliseconds previous)	> 100 kPa 80 consecutive BARO C readings	Diagnostic is Enabled LIN communications established with MAF		4 failures out of 5 samples Each sample takes 2.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 - Forced Engine Shutdown	P228A	Determines when rail pressure is lower than desired setpoint and metering unit actuator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded fuel flow for metering unit	> 30 MPa ≥ Maximum flow deliverable by high pressure pump (refer to *RailPresCntrl* section)	Powertrain relay voltage Engine Mode Run Rail pressure is governed by Fuel Metering Unit (refer to *RailPresCntrl)*	>= 11.0V == True == True	160 failures out of 320 samples 25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 2 - Forced Engine Shutdown	P228B	Determines when rail pressure is lower than desired setpoint and rail pressure regulator has achieved its maximum authority.	Rail pressure setpoint - measured rail pressure Commanded pressure for pressure regulator valve	> 30 MPa > 50 to 275 MPa (see table **P228B Pressure Regulator completely closed command**)	Powertrain relay voltage Engine Mode Run Pressure Regulator controlled in closed loop (refer to *RailPresCntrl)*	>= 11.0V == True == True	160 failures out of 320 samples 25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too Low	P228C	Determines when rail pressure is lower than desired setpoint.	Rail pressure setpoint - measured rail pressure	> 15.50 MPa	Powertrain relay voltage Engine Mode Run Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0V == True == True >4.0 mm^3/stroke ==0.00 == False) ==0.00 >=0kPa) ==0.00 >=-40 °C)	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Rail pressure setpoint - measured rail pressure	> 15.50 MPa	Powertrain relay voltage Engine Mode Run Pressure Regulator controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0V == True == True >2.0 mm^3/stroke ==0.00 == False) ==0.00 >=0kPa) ==0.00 >=-40 °C)	320 failures out of 640 samples 25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 1 Exceeded Control Limits - Pressure Too High	P228D	Determines when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure	< -25.00 MPa	Powertrain relay voltage Fuel Metering Unit controlled in closed loop (refer to *RailPresCntrl)* Fuel injected quantity Fuel temperature (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	>= 11.0V == True >4.0 mm^3/stroke > -40 °C == 0.00 == False) == 0.00 >=0kPa) == 0.00 >=-40 °C)	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips MIL is illuminated according to 'similar engine conditions' criteria.
			Rail pressure setpoint - measured rail pressure	<-25 MPa	Powertrain relay voltage Pressure Regulator controlled in closed loop (refer to RailPresCntrl)	>= 11.0V == True	320 failures out of 640 samples 25 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fuel injected quantity	> 2.00 mm^3/stroke		
					(Low fuel level calibrated as enabling condition	==0.00		
					OR			
					LowFuelConditionDiagnostic	== False)		
					(Air ambient pressure calibrated as enabling condition	==0.00		
					OR			
					Air ambient pressure	>=0kPa)		
					(Air ambient temperature calibrated as enabling condition	==0.00		
					OR			
					Air ambient temperature	>=-40 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator 2 Performance	P2293	Determines when rail pressure is above maximum threshold when pressure is governed by Pressure Regulator valve.	Rail pressure	>68 to 268 MPa (see table **P2293 Maximum rail pressure with PR)**	Powertrain relay voltage Rail pressure is governed by Pressure Regulator (refer to *RailPresCntrl)*	>=11.0 == True	121 failures out of 242 samples OR 121 continuous failures 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit	P2294	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit: impedance between signal and controller ground	> 200 kQ	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	> 11.0V > 5.0 V	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit Low Voltage	P2295	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground: impedance between signal and controller ground	< 0.5 Q	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	> 11.0V > 5.0 V	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator Solenoid 2 Control Circuit High Voltage	P2296	Controller specific output driver circuit diagnoses the Rail Pressure Regulator valve low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power: impedance between signal and controller power	< 0.5 Q	Powertrain relay voltage Run crank voltage Engine not cranking Pressure Regulator calibrated as present	> 11.0V > 5.0 V	61 failures out of 122 samples 6.25 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator C Control Circuit/Open	P233A	This DTC detects an Open Circuit on the Fuel Metering Unit valve 2	Current low across High and Low Side drivers during ON state indicates an open circuit.	Impedence between High Side and Low Side pins of the the Fuel Metering Unit valve 2 > 200 kQ	Powertrain relay voltage Engine cranking Run crank active	> 11.0V == FALSE ==TRUE	failures out of samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator C Control Circuit Low	P233B	This DTC detects a short circuit to ground of the Low Side driver circuit of the Fuel Metering Unit valve 2	Voltage low across Low Side driver during OFF state indicates short-to-ground.	Impedence between Low Side pin of the Fuel Metering Unit valve 2 and the controller ground < 0.5 Q	Powertrain relay voltage Engine cranking Run crank active	> 11.0V == FALSE ==TRUE	failures out of samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Regulator C Control Circuit High	P233C	This DTC detects a short circuit to power of the Low Side driver circuit of the Fuel Metering Unit valve 2	Voltage high across Low Side driver during ON state indicates short to power.	Impedence between Low Side pin of the Fuel Metering Unit valve 2 and the controller power < 0.5 Q	Powertrain relay voltage Engine cranking Run crank active	> 11.0V == FALSE ==TRUE	failures out of samples 100 ms/sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Position Sensor Circuit Low	P23C4	Circuit Continuity This DTC detects a short to ground in the position sensor signal circuit. This is accomplished by monitoring the reported position. If the position goes out of the expected range the DTC is set.	Engine Coolant Bypass Valve C Positions Sensor SENT digital read value	<50	Diagnostic is Enabled SENT communitation is not in error Run Crank Ignition in Range Engine not cranking Engine Diag System	 VECR_MRV_LoC_FP = True = True = Enabled	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Position Sensor Circuit High	P23C5	Circuit Continuity This DTC detects a short to power in the position sensor signal circuit. This is accomplished by monitoring the reported position. If the position goes out of the expected range the DTC is set.	Engine Coolant Bypass Valve C Positions Sensor SENT digital read value	>4,050	Diagnostic is Enabled SENT communitation is not in error Run Crank Ignition in Range Engine not cranking Engine Diag System	 VECR_MRV_LoC_FP = True = True = Enabled	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Motor Current High	P23C6	Controller specific output driver circuit detects an overcurrent condition in the load circuit for the Engine Coolant Bypass Valve C when the H-Bridge is energized.	Current measurement outside of controller specific acceptable range when H-Bridge is energized	8.1 A < X < 12.8A	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking Engine Diag System Driver over current status is not	 = True = True = Enabled = Indeterminate	2 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Reductant Injection Control At Limit - Flow Too Low	P249D	This diagnosis checks if the DEF injection system has exceeded the limit of correction authority. The monitoring is executed by comparing the long-term adaptation factor (LTAF) with a calibratable threshold: LTAF > OBD high threshold. The long-term adaptation factor is calculated based on the information given by the NH3 storage correction strategy. This factor represents the measured deviation of the complete SCR system and shall be used to compensate it by making a correction over the DEF injection quantity.	Long-term adaptation factor (LTAF) higher than calibratable threshold	LTAF >1.74	Test enabled by calibration;	CalOut = 1 [Boolean];	One failure to set the DTC.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the ECM run/ crank is active.	Ignition switch Run/Start position circuit low	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	106 failures out of 132 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the ECM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	320 failures out of 400 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message 2's complement not equal ($189/$199) OR Rolling count error - Serial Communication message ($189/$199) rolling count index value OR Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase OR Multi-transition error - Trans torque intervention type request change	Message <> two's complement of message Message <> previous message rolling count value + one > 600 Nm Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic Status Power Mode Ignition Voltage Engine Running Run/Crank Active No Serial communication loss to TCM (U0101)	Enabled = Run > 6.41 volts = True > 0.50 Sec No loss of communication	>=16 failures out of 20 samples. Performed on every received message >= 6 Rolling count errors out of 10 samples. Performed on every received message >= 6 range errors out of 10 samples. Performed on every received message >= 5 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Hood Switch Performance	P257D	This DTC monitors the hood switch rationality	Hood Switch position is in an invalid position. The hood switch reading is invalid in these ranges. Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	 59.34% to 66.96% 43.4% to 45.7%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Hood Switch Short to Ground / Low Voltage	P257E	This DTC monitors the hood switch for a short to ground or low voltage condition	Hood Switch position reading is lower than an expected bounds for The hood switch reading is lower than expected bounds at: Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	< 17.2% < 28.54%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Hood Switch Short to Voltage / High Voltage	P257F	This DTC monitors the hood switch for a short to voltage or high voltage condition	Hood Switch position reading is higher than an expected bounds for The hood switch reading is higher than expected bounds at: Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	 > 85.2% > 67.8%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unmetered Fuel - Forced Engine Shutdown	P25BD	Determines if engine overspeed condition is occuring when no fuel is being delivered	Engine Speed exceeds a threshold for a period of time	Fail Condition: Engine Speed > 5,800 RPM		Engine Speed > 1,500 RPM	Fail threshold: Overspeed condition TRUE > 500.0 milliseconds	Type A, 1 Trips
			Engine Speed less than a threshold for a period of time	Pass Condition: Engine Speed < (5,800 - 300) RPM		Engine Speed > 1,500 RPM	Pass threshold: Overspeed condition FALSE > 500.0 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Pump “A” Control Circuit Stuck On	P261F	The purpose of the diagnostic is to detect and report a failure of the component. This diagnostic checks the commanded off state of the pump to ensure that it is not reporting an actual speed that would represent a commanded on state. If the enable criteria are met when the pump is commanded off, the actual speed is evaluated. If the actual speed is greater than the calibrated fault threshold, the diagnostic reports a FAIL. If the actual speed does not exceed the calibrated fault threshold, the diagnostic reports a PASS. The diagnostic will continue to report as long as the enablement criteria are met.	Pump Feedback Speed	>= 1,500.00 RPM	Diagnostic is Enabled 12V System Voltage PECR_AuxCoolPmpSpdActl_Fol PECR_AuxCoolPmpSpdActl_Av Any of the following criteria are met for a) Pump Enable b) Pump Command Speed in Range	 > 11.00 V (with hysteresis disable < 10.00 V) = Not Active = Not Active >= 3.00 s True 0.00 RPM to 299.00 RPM	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Off Timer Performance	P262B	This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active.	Count Up Test: Time difference between the current read and the previous read of the timer Range Test: The variation of the HWIO timer and mirror timer is	> 1.50 seconds > 0.25%.			Count Up Test: 8 failures out of 40 samples 1 sec / sample Continuous while run/crank is not active and until controller shutdown is initiated. Range Test: Once per trip when controller shutdown is initiated or run/ crank becomes active.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Control Circuit/Open	P26B7	Controller specific output driver circuit detects an open circuit in the load circuit for the Engine Coolant Bypass Valve C when the H-Bridge is energized.	Driver reports an open control cirucit condition	= TRUE	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking Engine Diag System Driver control circuit open status is not	 = True = True = Enabled = Indeterminate	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Range/ Performance	P26BB	This DTC will detect when the valve cannot achieve the desired position within a calibrated threshold (degrees (angle)) after the Target position has stabilized for a calibratable amount of time or is moving slower than a calibratable rate. A failure of this diagnostic would indicate a slow or stuck part.	Absolute position deviation between target and actual	> 12.0 Degrees	Diagnostic is Enabled No DTCs Closed Loop position control Soft Closing function Soft Opening function Valve anti-sticking routine Engine Diag System Engine not cranking Run Crank Ignition in Range Engine Outlet Coolant OR OBD Coolant Enable Criteria	 VECR_MRV_LoC_FA VECR_MRV_PstnSnsrCkt_FA VECR_MRV_PstnSnsrCkt_TFTKO VECR_M RV_PstnPerf_FA = Active = Inactive = Inactive = Inactive = Enabled = True = True >-20.0 °C = TRUE	6 seconds out of a 7 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Stuck Open	P26C0	This diagnostic detects the performance of the Block Rotary Valve, bounded by the two mechanical endstops. It monitors the difference between raw position feedback and position request. If the enable criteria are met and the position difference exceeds the failed threshold and the raw position feedback reports a value that is above the calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met.	Absolute value of the position difference between position request and position feedback AND Coolant Valve Position Feedback	>= 10.00° >= 50.00°	Diagnostic is Enabled The following shall be satisfied for [12V System Voltage VECR_BRV_PstnFdbk_Av, VECR_BRV_PstnFdbk_Fol, VECR_BRV_CktLo_FP, VECR_BRV_CktHi_FP VECR_BRV_CktLo_FA, VECR_BRV_CktHi_FA PowertrainRelayStateOn_FA, Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Coolant Valve Position Command If Use Engine Block Coolant Temperature is TRUE, then the following shall be used [Engine Block Coolant Enable Temperature] Coolant Valve Calibration	 >= 0.10 seconds >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = No Fault Active = True = between -5.00 ° and 115.00° = 1.00 >= -34.00 °C (hystersis disable <= -35.00 °C) Has not been triggered for	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run**	greater than 37.00 seconds		
					Change in Two Consecutive Coolant Valve Position Command]	<= 5.00 ^{0} for more than 2.50 seconds		
					** Calibration run is a set of pre-defined valve movements for calibrating the position sensor and learning the position of the endstops.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Stuck Closed	P26C2	This diagnostic detects the performance of the Block Rotary Valve, bounded by the two mechanical endstops. It monitors the difference between raw position feedback and position request. If the enable criteria are met and the position difference exceeds the failed threshold and the raw position feedback reports a value that is below the calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met.	Absolute value of the position difference between position request and position feedback AND Coolant Valve Position Feedback	>= 10.00° < 50.00°	Diagnostic is Enabled The following shall be satisfied for [12V System Voltage VECR_BRV_PstnFdbk_Av VECR_BRV_PstnFdbk_Fol VECR_BRV_CktLo_FP, VECR_BRV_CktHi_FP VECR_BRV_CktLo_FA, VECR_BRV_CktHi_FA PowertrainRelayStateOn_FA, Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Coolant Valve Position Command If Use Engine Block Coolant Temperature is TRUE, then the following shall be used [Engine Block Coolant Enable Temperature] Coolant Valve Calibration	 >= 0.10 seconds >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = No Fault Active = True = between -5.00 ° and 115.00° = 1.00 >= -34.00 °C (hystersis disable <= -35.00 °C)	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run** Change in Two Consecutive Coolant Valve Position Command] ** Calibration run is a set of pre-defined valve movements for calibrating the position sensor and learning the position of the endstops.	Has not been triggered for greater than 37.00 seconds <= 5.00 ° for more than 2.50 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high command not 4WD high ratio	P279A	Monitor measured transfer case gear ratio is 4WD low ratio or neutral while the transfer case control module command state is 4WD high. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD low ratio window OR measured transfer case ratio is in neutral window AND measured transfer case ratio is in 4WD low ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD high 4WD low ratio window < 3.00 > 2.40 neutral ratio window < 1.20 > 0.80 OR < 2.90 > 2.50 4WD low ratio window < 2.90 > 2.50	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	 > 500.0 RPM > 80.0 Nm > 300.0 RPM > 5.0 % <100.0 % > 500.0 RPM > 80.0 Nm > 300.0 PRM > 5.0 % < 100.0 % = 1.00 Boolean = FALSE = FALSE P057B, P057C, P057D, P057E P17D4, P279B, P279C P0502, P0503, P0722, P0723, P2160, P2161	fail counts > 560.00 counts out of sample counts > 800.00 counts update rate 12.5 milliseconds for 1 count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD low command not 4WD low ratio	P279B	Monitor measures transfer case gear ratio is 4WD high ratio or neutral while the transfer case control module command state is 4WD low. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD high ratio window OR measured transfer case ratio is in neutral window AND measured transfer case ratio is in 4WD high ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD low 4WD high ratio window < 1.30 > 0.70 neutral ratio window < 1.20 > 0.80 OR < 2.90 > 2.50 4WD high ratio window < 1.20 > 0.80	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	 > 500.0 RPM > 80.0 Nm > 300.0 RPM > 5.0 % < 100.0 % > 500.00 RPM > 80.0 Nm > 300.0 PRM > 5.0 % < 100.0 % = 1.00 Boolean = FALSE = FALSE P057B, P057C, P057D, P057E P17D4, P279A, P279C P0502, P0503, P0722, P0723, P2160, P2161	fail count > 560.00 counts out of sample count >800.00 counts update rate 12.5 milliseconds for 1 count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD neutral command not 4WD neutral ratio	P279C	Monitor measured transfer case gear ratio is 4WD high ratio or 4WD low ratio while the transfer case control module command state is 4WD neutral. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD low ratio window OR measured transfer case ratio is in 4WD high window AND measured transfer case ratio is in 4WD low ratio window or in 4WD high ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD neutral 4WD low ratio window < 3.00 > 2.40 4WD high ratio window > 1.30 < 0.70 4WD neutral ratio window < 2.90 > 2.50 OR < 1.20 > 0.80	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	> 300.0 RPM > -20.0 Nm > 0.0 RPM > 0.0 % < 100.0 % > 500.0 RPM > 80.0 Nm > 300.0 PRM > 5.0 % < 100.0 % = 1 AND = 1.00 Boolean = FALSE = FALSE P057B, P057C, P057D, P057E P17D4, P279A, P279B P0502, P0503, P0722, P0723, P2160, P2161	fail count> 840.00 counts out of sample count > 1,200.00 counts update rate 12.5 milliseconds for 1 count	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Position Sensor Circuit Low Voltage	P29FA	This diagnostic continuously detects if the Block Rotary Valve Position Feedback signal is too low and out of the expected operating range, defined by any position below the lower mechanical end-stop. If the enable criteria are met and the raw position feedback is below the out of range low position fail threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met. This diagnostic will suspend when a matured fault is detected while the valve is performing the integrity check and will re-enable when the valve performs the integrity check again at the end of the next drive cycle.	Coolant Valve Position Feedback	< -7.00°	Diagnostic is Enabled 12V System Voltage VECR_BRV_PstnFdbk_Av , VECR_BRV_PstnFdbk_Fol PowertrainRelayStateOn_FA , Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Diagnostic Position Override Enable	 >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = True = False	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Position Sensor Circuit High Voltage	P29FB	This diagnostic continuously detects if the Block Rotary Valve Position Feedback signal is too high and out of the expected operating range, defined by any position above the upper mechanical endstop. If the enable criteria are met and the raw position feedback is greater than the out of range high fail threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met. This diagnostic will suspend when a matured fault is detected while the valve is performing the integrity check and will re-enable when the valve performs the integrity check again at the end of the next drive cycle.	Coolant Valve Position Feedback	> 117.00°	Diagnostic is Enabled 12V System Voltage VECR_BRV_PstnFdbk_Av, VECR_BRV_PstnFdbk_Fol PowertrainRelayStateOn_FA, Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Diagnostic Position Override Enable	 >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = True = False	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 5 Circuit Low (Diesel L6 ATM)	P2B2D	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8:	< X Ohms X is equal to: Temp Sensor 1: 49 Ohms Temp Sensor 2: 48.8 Ohms Temp Sensor 3: 43.2 Ohms Temp Sensor4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 6: 62.3 Ohms Temp Sensor?: 48.8 Ohms Temp Sensor 8: 62.3 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 5 Circuit High (Diesel L6 ATM)	P2B2E	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5	> X Ohms X is equal to: Temp Sensor 1: 230,546 Ohms Temp Sensor 2: 230,546 Ohms Temp Sensor 3: 338,540 Ohms Temp Sensor4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 6: 380,707 Ohms Temp Sensor 7: 230,546 Ohms Temp Sensor 8: 380,707 Ohms	Diagnostic is Enabled Engine run time OR IAT min	 > 10.0 seconds > -20.0 °C	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Motor Current High	P2B58	This monitor checks whether the current in the Engine Coolant Flow Control Valve DC motor driver is too high.	Current flowing through the DC motor driver higher than a threshold (error information provided by HWIO)	> 5.5 [A]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled Test failed this key cycle	== 1.00 > 11.00 [V] == False == True PECR_MtrCurrLim_TFTK0 == False	20.00 fails out of 25.00 samples Sampling rate: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Control Circuit/Open	P2B59	This monitor checks whether any of the Engine Coolant Flow Control Valve DC motor wires is disconnected.	Load resistance higher than a threshold (error information provided by HWIO)	>200 [kOhm]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled Error indication provided by HWIO	== 1.00 > 11.00 [V] == False == True != Indeterminate	20.00 fails out of 25.00 samples Sampling rate: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Control Circuit High	P2B5B	This monitor checks whether any of the Engine Coolant Flow Control Valve DC motor wires is shorted to power.	Current flowing through the DC motor driver higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled Error indication provided by HWIO	== 1.00 > 11.00 [V] == False == True != Indeterminate	20.00 fails out of 25.00 samples Sampling rate: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve SupplyCircuit Low	P2B5C	This monitor checks whether the supply voltage at the Engine Coolant Flow Control Valve DC motor driver is too low.	Supply voltage at the DC motor driver lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled Error indication provided by HWIO	== 1.00 > 11.00 [V] == False == True != Indeterminate	20.00 fails out of 25.00 samples Sampling rate: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Position Sensor Circuit Low	P2B5E	This monitor checks whether the Engine Coolant Flow Control Valve position is below a lower threshold.	SENT position raw value lower than a threshold	<2.00 [%5V]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled SENT communication fault	== 1.00 > 11.00 [V] == False == True PECR_SENT_LossComm_Flt == False	20.00 fails out of 25.00 samples Sampling rate: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Position Sensor Circuit High	P2B5F	This monitor checks whether the Engine Coolant Flow Control Valve position is above an upper threshold.	SENT position raw value higher than a threshold	> 98.00 [%5V]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled SENT communication fault	== 1.00 > 11.00 [V] == False == True PECR_SENT_LossComm_Flt == False	20.00 fails out of 25.00 samples Sampling rate: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Flow Control Valve Position Sensor Circuit Range/ Performance	P2B60	This monitor checks whether the Engine Coolant Flow Control Valve position is unable to reach the desired position.	Absolute difference between desired position and measured position higher than a threshold	> 12.00 [%]	Test enabled Diagnostic system enabled Engine cranking Powertrain relay voltage Desired position rate of change AND Desired position rate of change AND Time since rate of change is in range Closed-loop position contro active Engine coolant temperature OR OBD Coolant Temp enabled Engine coolant temperature fault active Outside air temperature Outside air temperature fault active Actuator fault SENT position sensor fault Valve perfomance test	== 1.00 == True == False > 11.00 [V] > -30.00 < 30.00 > 2.50 == True > -50.00 [°C] == True ECT_Sensor_FA == False > -50.00 [°C] OAT_PtEstFiltFA == False PECR_Actr_Flt == False PECR_PstnSnsr_Flt == False	60.00 fails out of 75.00 samples Sampling rate: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					failed this key on	PECR_Obstruction_TFTK 0 == False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Pump Overspeed	P2B83	This DTC indicates a out of range high failure of the pump speed.	Actual pump speed	>= 8,500 rpm	Pump H/W present Diagnostic enabled **************************** Powertrain relay voltage Or WCP direct connected too Batt **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	[illegible]ru [illegible]ru **************************** >= [illegible] [illegible]al ****************************	8 failures out of 10 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Pump Underspeed	P2B84	This DTC indicates a out of range low failure of the pump speed.	Actual pump speed	< -115 rpm	Pump H/W present Diagnostic enabled **************************** Powertrain relay voltage Or WCP direct connected too Batt *************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	[illegible]ru[illegible] [illegible]ru [illegible] >= [illegible] [illegible]al[illegible] [illegible]	8 failures out of 10 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Pump "A" Overspeed	P2B86	The purpose of the performance diagnostic is to detect and report a failure of the component. If the enable criteria are met, the difference between the commanded speed and the component actual speed is calculated. An overspeed condition is when the commanded speed is less than the component actual speed. The speed difference is filtered and when the difference is less than the overspeed calibrated fault threshold, the diagnostic reports a FAIL. If filtered speed difference does not exceed the overspeed calibrated fault threshold, the diagnostic reports a PASS. The diagnostic will continue to report as long as the enablement criteria are met. There are two different failure criteria as the pump feedback speed is dependent on the system voltage.	Any of the following fail criteria is met: Criterial: Filtered (Pump Command Speed - Pump Feedback Speed) 12V System Voltage Criteria 2: Filtered (Pump Command Speed - Pump Feedback Speed) 12V System Voltage	< **P2B86 Coolant Pump “A” Overspeed Fail Threshold** (RPM) >=12.00 V < **P2B86 Coolant Pump “A” Overspeed Fail Threshold Low Volatage** (RPM) <12.00 V (See supporting tables for the above threshold values)	Diagnostic is Enabled Difference in Pump Command Speed from previous data sample to present data sample Any of the following criteria is met: Criteria 1: Calibration to use fault pending is TRUE PECR_EAP_SpeedOORL _FP PECR_EAP_SpeedOOR H_FP Criteria 2: Calibration to use fault pending is FALSE All of the following criteria is met 2a) PECR_EAP_SpeedOORL _FA PECR_EAP_SpeedOORL _TFTKO 2b) PECR_EAP_SpeedOOR H_FA PECR_EAP_SpeedOOR H-TFTKO	<50.00 RPM for >= 2.00 s = 1.00(1 is TRUE) = Not Active = Not Active = 1.00 (0 is FALSE) = Not Active = Not Active = Not Active = Not Active	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All of the following criteria are met for Time Delay: (See "Time Delay" definition below)			
					12V System Voltage	> 11.00 V (with hysteresis disable < 10.00 V)		
					PECR_AuxCoolPmpSpdActl_FoI	= Not Active		
					PECR_AuxCoolPmpSpdActl_Av	= Not Active		
					Pump Enable	= True		
					Pump Command Speed in Range	300.00 RPM <= Command Speed <= 3,480.00 RPM		
					Any of the following criteria is met:			
					Criteria 1: Engine inlet coolant temperature check calibration is TRUE	= 0.00 (1 is TRUE)		
					Criteria 2: a) EECR_EngineInlet_FA	= Not Fault Active		
					b) Engine Inlet Coolant Temperature	>= -40.00 °C		
					Where: "Time Delay"	>=2.00 s		
					If all of the following criteria are met:			
					a) Engine inlet coolant temperature check			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					calibration is FALSE b) Engine Inlet Coolant Temperature Else "Time Delay"	= 0.00 (0 is FALSE) <= -30.00 degC >= 1.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Pump "A" Underspeed	P2B87	Detects when the coolant pump speed is slower than the commanded speed.	Any of the following fail criteria is met: Criterial: Filtered (Pump Command Speed - Pump Feedback Speed) 12V System Voltage Criteria 2: Filtered (Pump Command Speed - Pump Feedback Speed) 12V System Voltage	 < **P2B87 Coolant Pump "A" Underspeed Fail Threshold** (RPM) >=12.00 V < **P2B87 Coolant Pump "A" Underspeed Fail Threshold Low Voltage** (RPM) <12.00 V (See supporting tables for the above threshold values)	Diagnostic is Enabled Difference in Pump Command Speed from previous data sample to present data sample Any of the following criteria is met: Criteria 1: Calibration to use fault pending is TRUE PECR_EAP_SpeedOORL_FP PECR_EAP_SpeedOORH_FP Criteria 2: Calibration to use fault pending is FALSE All of the following criteria is met 2a) PECR_EAP_SpeedOORL_FA PECR_EAP_SpeedOORL_TFTKO 2b) PECR_EAP_SpeedOORH_FA PECR_EAP_SpeedOORH-TFTKO	 <50.00 RPM for >= 2.00 s = 1.00(1 is TRUE) = Not Active = Not Active = 1.00 (0 is FALSE) = Not Active = Not Active = Not Active = Not Active	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All of the following criteria are met for Time Delay: (See "Time Delay" definition below)			
					12V System Voltage	> 11.00 V (with hysteresis disable < 10.00 V)		
					PECR_AuxCoolPmpSpdActl_FoI	= Not Active		
					PECR_AuxCoolPmpSpdActl_Av	= Not Active		
					Pump Enable	= True		
					Pump Command Speed in Range	300.00 RPM <= Command Speed <= 3,480.00 RPM		
					Any of the following criteria is met:			
					Criteria 1: Engine inlet coolant temperature check calibration is TRUE	= 0.00 (1 is TRUE)		
					Criteria 2: a) EECR_EngineInlet_FA	= Not Fault Active		
					b) Engine Inlet Coolant Temperature	>= -40.00 °C		
					Where: "Time Delay"	>=2.00 s		
					If all of the following criteria are met:			
					a) Engine inlet coolant temperature check			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					calibration is FALSE b) Engine Inlet Coolant Temperature Else "Time Delay"	= 0.00 (0 is FALSE) <= -30.00 degC >= 1.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Delivery Performance Maximum Authority	P2BAA	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery.This monitor determines when RDP compensation has achieved the maximum authority without being able to achieve the expected pressure drop that guarantees proper reductant delivery performance.	Reductant Delivery Perfomance compensation factor Actual DEF line pressure drop - Expected DEF line pressure drop	>1.70 >-1,000.00 kPa	Closed loop of Reductant Delivery Performance Compensation running		10 fails out of 20 samples (100 ms/sample)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 5 Circuit Intermittent/ Erratic (Diesel L6 ATM)	P2BB5	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5 Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt		Diagnostic is Enabled No Active DTC's	 EECR_TS5_Erratic_TFTK0 EECR_TS5_CktHiLo_FA	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The calculated high and low limits for the next reading use the following calibrations: Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 3.1 seconds -60.0 °C 150.0 °C 2.4 seconds -60.0 °C 150.0 °C 3.6 seconds -60.0 °C 150.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 4.0 seconds -60.0 °C 250.0 °C 3.4 seconds -60.0 °C 150.0 °C 4.0 seconds -60.0 °C 250.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Fuel Pressure Regulator A Exceeded Control Limits - Pressure Too Low	P2C1F	Determines when rail pressure is lower than desired setpoint during Cold Start	Rail pressure setpoint - measured rail pressure OR Rail pressure setpoint - measured rail pressure	> 15.50 MPa > 15.50 MPa	Cold Start strategy enabled Powertrain relay voltage Engine Mode Run Fuel Metering Unit OR Pressure Regulator controlled in closed loop (refer to RailPresCntrl) (Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature OR (Fuel injected quantity (Low fuel level calibrated	== TRUE >= 11.0V == True == True >4.0 mm^3/stroke ==0.00 == False) ==0.00 >=0kPa) ==0.00 >=-40 °C)) >2.0 mm^3/stroke	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	==0.00 == False) ==0.00 >= 0 kPa) ==0.00 >=-40 °C))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Fuel Pressure Regulator A Exceeded Control Limits - Pressure Too High	P2C20	Determines when rail pressure is greater than desired setpoint.	Rail pressure setpoint - measured rail pressure OR Rail pressure setpoint - measured rail pressure	<--25.00 MPa < -25 MPa	Cold Start strategy enabled Powertrain relay voltage Engine Mode Run Fuel Metering Unit OR Pressure Regulator controlled in closed loop (refer to RailPresCntrl) (Fuel injected quantity Fuel temperature (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature OR	== TRUE >= 11.0V == True == True >4.0 mm^3/stroke > -40 °C == 0.00 == False) == 0.00 >=0kPa) == 0.00 >=-40 °C)	320 failures out of 640 samples 25 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(Fuel injected quantity (Low fuel level calibrated as enabling condition OR LowFuelConditionDiagnostic (Air ambient pressure calibrated as enabling condition OR Air ambient pressure (Air ambient temperature calibrated as enabling condition OR Air ambient temperature	 > 2.00 mm^3/stroke ==0.00 == False) ==0.00 >= 0 kPa) ==0.00 >=-40 °C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature Sensor A/B Correlation	P2C21	Determines if one of the redundant oil temperature sensors is biased or stuck in range. Three independent tests can be used.1) Cold Start Test Compares EOT to ECT and IAT at powerup after a long soak (Fast and regular tests). 2) Warm Up Test Compares EOT to a target EOT after a large enough accumulated airflow has occurred. 3) Continuous Test Compares Sensor A to Sensor B.	**Fast Cold Start Test** To indicate an fast fail: Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup IAT - Powerup ECT To indicate a fast pass: Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - Powerup IAT	EOT Temp Diff > **FastFailTempDiff** (See P0196 details on Supporting Tables Tab) AND < 16 degrees C < 16 degrees C AND < 16 degrees C	EOT Diagnostic main Status AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity No active DTC's	Enabled = True Enabled > 540 Seconds = True Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuit FA	Cold Start Fast Test - one failure out of one sample - test performed once per second	Type B, 2 Trips
			Cold Start Test Pass Condition 1: Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - minIAT OR Pass Condition 2: Absolute value of Powerup EOT - Powerup ECT	<= 16 Deg C <= 16 Deg C OR > 16 Deg C	All three tests (Cold/ Warm/Continuous) EOT Diagnostic main enable AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity	Enabled = True Enabled > 540 Seconds = True	Cold Start Regular Test - one failure out of one sample - test performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND (IAT minimum observed with Block Heater or (IAT minimum observed and Absolute value of power up IAT - min. observed IAT)) AND Absolute value of Powerup EOT - Powerup IAT AND Absolute value of Powerup EOT - minIAT <u>Fail Condition:</u> Absolute value of Powerup EOT - Powerup ECT AND (IAT minimum observed with Block Heater or (IAT minimum observed and Absolute value of power up IAT - min. observed IAT)) AND (Absolute value of Powerup EOT - Powerup IAT or Absolute value of Powerup EOT - minIAT) AND Absolute value of Powerup ECT - Powerup IAT	AND > -7 Deg C > -10 Deg C <= 5 Deg C AND <= 16 Deg C <= 16 Deg C > 16 Deg C AND > -7 Deg C > -10 Deg C <= 5 Deg C AND > 16 Deg C > 16 Deg C AND <= 16 Deg C	Time above Minimum Vehicle Speed Time less than Vehicle speed resets above timer No active DTC's	> 9 MPH for > 400 seconds < 15.0 for > 20.0 seconds Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND Absolute value of Powerup ECT - minIAT	AND <= 16 Deg C				
			Warmup Test <u>Warm Up Fail Condition:</u> EOT <u>Warm Up Test Pass Condition:</u> EOT	 < 70 Deg C => 70 Deg C	EOT Diagnostic main enable Engine Running Warm Up EOT Test Specific Conditions: Use Warm Up EOT Diagnostic Power up ECT Power up ECT Total accumulated engine airflow since engine start DISABLE CONDITIONS (for all three tests)No active DTC's	Enabled = True Disabled > -7 degrees C < 165 degrees C >= **P0196_TotalAccumulatedFlow** (See P0196 details on Supporting Tables Tab) Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA	Warm up Tests - one failure out of one sample - test performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Continuous Test <u>Pass Condition:</u> (Measured Oil Temperature A - Measured Oil Temperature B) OR Absolute value of (Measured Oil Temperature A - Measured Oil Temperature B) <u>Fail Condition:</u> (Measured Oil Temperature A - Measured Oil Temperature B) AND Absolute value of (Measured Oil Temperature A - Measured Oil Temperature B)	>= 0 and <= 15.8 OR >= 0 and <= 15.8 > 15.8 AND > 15.8	Redundant Sensor Enable EOT Diagnostic main Enable Engine Running Continuous EOT Test Specific Conditions: Power up ECT and ECT All of three criteria above AND EOT Model Oil Temperature reach Equilibrium OR Use quick transition to equilibrium state and ECT DISABLE CONDITIONS (for all three tests)No active DTC's	Enabled Enabled = True Enabled >= -7 and <= 110 Deg C >= 45 and <= 105 Deg C >= 82 Deg C Disabled and >= ECT from 5 sec previous Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA IAT_SensorCircuitFA EngOilModeledTempValid	Continuous Test 8 failures out of 10 samples performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor B Circuit Low	P2C3A	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngMetalHeadSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8:	< X Ohms X is equal to: Temp Sensor 1: 49 Ohms Temp Sensor 2: 48.8 Ohms Temp Sensor 3: 43.2 Ohms Temp Sensor4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 6: 62.3 Ohms Temp Sensor 7: 48.8 Ohms Temp Sensor 8: 62.3 Ohms	Diagnostic is Enabled		5 seconds out of a 6 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHe adTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor B Circuit High	P2C3B	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngMetalHeadTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngMetalHe adTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 8:	> X Ohms X is equal to: Temp Sensor 1: 230,546 Ohms Temp Sensor 2: 230,546 Ohms Temp Sensor 3: 338,540 Ohms Temp Sensor4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 6: 380,707 Ohms Temp Sensor 7: 230,546 Ohms Temp Sensor 8: 380,707 Ohms	Diagnostic is Enabled Engine run time OR IAT min	 > 10.0 seconds > -20.0 °C	5 seconds out of a 6 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_EngMetalHeadTempSnsr					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor B Circuit Intermittent/ Erratic	P2C3C	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngMetalHeadTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt		Diagnostic is Enabled No Active DTC's	 EECR_EMT2_CktHiLo_F A EECR_EMT2_Erratic_TF TKO	5 seconds out of a 6 seconds window	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: CeEECR_e_EngMetalHeadTempSnsr2 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The calculated high and low limits for the next reading use the following calibrations: Temperature Sensor 1: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 2: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 3: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 4: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 5: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 3.1 seconds -60.0 °C 150.0 °C 2.4 seconds -60.0 °C 150.0 °C 3.6 seconds -60.0 °C 150.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 4.0 seconds -60.0 °C 250.0 °C 3.4 seconds -60.0 °C 150.0 °C 4.0 seconds -60.0 °C 250.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder Head Temperature Sensor A/B Correlation	P2C3D	This monitor detects a deviation between Cylinder Head Temperature sensor signal 1 and Cylinder Head Temperature sensor signal 2 on a continuous basis. If the deviation exceeds a threshold the DTC is set.	Absolute difference between temperature signal 1 and temperature signal 2 higher than a threshold	> 10.00 [°C]	Test enabled Temperature signal 1 fault active Temperature signal 2 fault active	== 1.00 EECR_HMR_Snsr1_FA == False EECR_HMR_Snsr2_FA == False	50.00 fails out of 60.00 samples Sampling rate: 250 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SCR NOx Catalyst Efficiency Below Threshold Bank 1 Catalyst 2 - EWMA Enabled	P2C7A	The diagnosis checks if there is a malfunction in the Underfloor SCR (UFSCR, or SCR2) catalyst by measuring its capability to store NH3 and to convert NOx. The monitor is based on two NOx sensors (upstream & downstream SCR2, also defined as NOx#2 and NOx#3 respectively) that measure both NH3 and NOx. The diagnostic parameter is SCR2 efficiency (it is indeed an "efficiency" index since it considers both NH3 storage capability and NOx conversion). Measured efficiency is compared to reference one (based on calibratable offset): - Measured efficiency is calculated as q_Eff_SCR2_Msrd = 1 - [f NOx_SCR2_Dwn_Msrd / J NOx SCR1_Up_Msrd]	EWMA filtering is applied to the difference between measured SCR2 efficiency (q_Eff_SCR2_Msrd) and reference one (q_Eff_SCR2_Ref)	Fail threshold is = 0, Repass threshold is = 0	Test enabled by calibration; No active DTCs; Diagnostic system not disabled; Test not yet executed on current key cycle except the case where EWMA filtering is in Rapid Response (RR) or Fast Initial Response (FIR) state; Tests per trip up to calibratable value when EWMA filter is in Fast Initial Response (FIR) state; Total tests executed in Fast Initial Response (FIR) state up to calibratable value; Tests per trip up to calibratable value when	CalOut = 1 [Boolean]; # NOX_Snsr2_NOx_Flt + NOX_Snsr3_NOx_Flt + EGT_TempSCR2_UpFlt # EGP_PresSCR2_UpFlt ≠ EXF_TotExhSCR2_UpFlt # SCR_RDP_Flt + SCR_TipStuckFltSt t SCR_DEFMV_FA ≠ SCR_ChemicalMdlFlt SC R2 ; NotDsbl = True [Boolean]; NotRun = True [Boolean]; FIR test trip < 1 ; FIR tot tests < 2 ; RR test trip < 1 ;	One failure to set the DTC.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		- Reference efficiency is evaluated as q_Eff_SCR2_Ref = 1 - [NOx_SCR2_Dwn_Ref / NOx_SCR1_Up_Msrd] NOx_SCR2_Dwn_Ref is calculated as NOx_SCR2_Dwn_Ref = NOx_SCR2_Up_Msrd * offset The offset **(K_EffOffset_SCR2)** is calibrated in order to detect a malfunction. Test is performed when NOx+NH3 integral upstream SCR2 reaches 400.00 [mg]. Use this section if EWMA filter is enabled (1.00 == 1 [Boolean]).			EWMA filter is in Rapid Response (RR) state; Total tests executed in Rapid Response (RR) state up to calibratable value; DEF system ready to inject; Urea inside the tank not frozen; Debounce time elapsed after DEF defrost has been completed; Upstream SCR2 NOx sensor measurement reliable; Downstream SCR2 NOx sensor measurement reliable; Slip detection SCR2 reliable; Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (SCR2 catalyst de-greened); SCR service bay test not active;	 RR tot tests < 4 ; DEF ready = True [Boolean]; DEF tank status = DEF_TankNotFrozen [Enumerative]; Debounce = 0 [s]; Reliable = True [Boolean]; Reliable = True [Boolean]; Slip detection SCR2 reliable = True [Boolean]; DPF Rgn Compt > 1 [-]; Service Bay Test == ServNotRunning [Enumerative];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Debounce time elapsed after exiting from SCR service bay test;	Debounce = 0 [s];		
					Outside ambient temperature higher than calibration with hysteresis;	OAT > -20 [°C]; -20 [°C] < hysteresis range < -20 [°C]		
					Ambient pressure higher than calibration with hysteresis;	Pressure > 72 [kPa]; 70 [kPa] < hysteresis range < 72 [kPa]		
					SCR1 average temperature in range;	220.00 [°C] < SCR1 mean temperature < 400 [°C];		
					Debounce time elapsed after SCR1 average temperature is in range;	Debounce = 5 [s];		
					Difference between SCR2 upstream and SCR2 downstream temperatures: - higher than first calibration curve (f[SCR2 mean temperature]) AND - lower than second calibration curve (f[SCR2 mean temperature]);	SCR2 up/down diff temperature > **T_MinTempGrad_SCR2** [°C] SCR2 up/down diff temperature < **T_MaxTempGrad_SCR2** [°C];		
					Debounce time elapsed after condition based on difference between SCR2 upstream and downstream temperature is met;	Debounce = 10 [s];		
					Exhaust mass flow			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					upstream SCR2 and SCR2 average temperature within calibratable limits defined by 2 size table (f[exhaust mass flow, SCR2 average temperature]), enabled if table output is greater than calibration; Debounce time elapsed after condition based on exhaust mass flow upstream SCR2 and SCR2 average temperature is met; SCR2 mean temperature time derivative within limits defined by maximum and minimum calibrations and debounce time elapsed based on following logic: - while SCR2 mean temperature time derivative is outside the limits, the system continuously evaluates the debounce time based on calibration curve (f[SCR2 mean temperature time derivative]) and records the maximum value; - instead when SCR2 mean temperature time derivative gets within the limits, countdown starts until debounce time has been reached;	**K_EffExhFlowCond_SCR2** > 1 [-]; Debounce = 5 [s]; -2 < Delta temperature < 2 [°C/s]; Debounce = **t_DerTempDsblTmr_SCR2** [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Upstream SCR2 NOxflow measurement lower than calibration;	SCR2 NOx up flow < 25 [mg/s];		
					Upstream SCR2 NOx flow measurement higher than calibration;	SCR2 NOx up flow > 0 [mg/s];		
					Upstream SCR2 NOx sensor measurement higher than calibration;	SCR2 NOx up > 35 [PPm];		
					Upstream SCR2 NOx sensor measurement lower than calibration;	SCR2 NOx up < 500 [PPm];		
					Upstream SCR2 absolute NOx flow derivative lower than calibration;	Delta SCR2 NOx up flow < 15 [mg/s^2];		
					Debounce time elapsed when all NOx conditions become true;	Debounce = 1 [s];		
					Slip conditions: - debounce time elapsed when no slip downstream SCR2 is detected any more, OR - when slip is active, NOx flow upstream SCR2 accumulated shall be greater than a calibration curve (f[SCR2 average temperature]);	Debounce = 30.00 [s] / NOx_SCR2Up > **m_SlipNOxIntglThrsh_SCR2** [mg];		
					Specific combustion modes not active;	Cmb # KaSCRR_b_MontrCombMode_SCR2 [Enumerative];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Debounce time elapsed after exiting from specific combustion modes;	Debounce = 60 [s];		
					SCR2 NH3 storage deviation error (difference between estimated storage and set-point): - higher than first calibration curve (f[SCR2 average temperature]) AND - lower than second calibration curve (f[SCR2 average temperature]);	SCR2 NH3 deviation > **m_NH3_StrgDevErrMin_SCR2** [g] SCR2 NH3 deviation < **m_NH3_StrgDevErrMax_SCR2** [g];		
					SCR2 NH3 storage: - higher than first calibration curve (f[SCR2 average temperature]) AND - lower than second calibration curve (f[SCR2 average temperature, exhaust mass flow upstream SCR2]) considering also SCR2 catalyst aging (one curve for degreened component and another curve for aged component, with interpolation for medium aging levels);	SCR2 NH3 storage > **m NH3 StrgMin SCR2** [g]; SCR2 NH3 storage (if catalyst is degreened) < **m_NH3_StrgMax_SCR2** [g]; SCR2 NH3 storage (if catalyst is aged) < **mN H3_StrgMaxAge_SCR2** [g]; interpolation for medium aging levels;		
					Debounce time elapsed after conditions based on SCR2 NH3 storage deviation error and SCR2 NH3 storage level are met;	Debounce = 5 [s];		
					SCR dosing in NH3			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					storage control or in intrusive NH3 storage control; Debounce time elapsed afetr switching to NH3 storage control or intrusive NH3 storage control;	Dos = NH3_StrgCntrl | Intrsv_NH3_StrgCntrl [Enumerative]; Debounce = 10 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 2 Underspeed Performance Fault [LIN Bus Electric PWM Fans Only - Internal or External controller]	P2CB9	Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling. Only after first fan activation, the fan will be held commanded on for enough time to ensure this monitor has an opportunity to mature a decision.	Measured Fan Speed	<= Speed Low Limit [Supporting Table] **P2CB9_LIN_Threshold**	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus Continuous Operation Fault Active h] Fan Commanded On	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <> True i] == TRUE	16.00 failures / 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 3 Underspeed Performance Fault [LIN Bus Electric PWM Fans Only - Internal or External controller]	P2CBB	Measured actual fan speed is monitored against a calibrated lower acceptable limit for the cooling fan RPM under normal operating conditions. The diagnostic is set when the threshold is crossed. This diagnostic ensures that the fan is not under cooling. Only after first fan activation, the fan will be held commanded on for enough time to ensure this monitor has an opportunity to mature a decision.	Measured Fan Speed	<= Speed Low Limit [Supporting Table] **P2CBB_LIN_Threshold**	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus Continuous Operation Fault Active h] Fan Commanded On	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <> True g] <> True h] ==TRUE	16.00 failures / 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Crank Control Circuit High Voltage	P305D	Diagnoses the DC/DC Converter Crank Control Circuit for circuit high faults	DC/DC Converter Crank Control	<> ECM Crank Control	Diagnostic enabled	1	320 failed samples out of 400 samples in 12.50 ms loop	Type B, 2 Trips
					If Global B electrical architecture Then (Run/Crank or Accessory)	1 TRUE		
					Else (Sensor Bus Relay On AND	TRUE		
					Sensor Bus Relay Fault Active)	FALSE		
					ECM Crank Control	FALSE		
					Battery Voltage	>= 6.60 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Crank Control Circuit Low Voltage	P305E	Diagnoses the DC/DC Converter Crank Control Circuit for circuit low faults	DC/DC Converter Crank Control	<> ECM Crank Control	Diagnostic enabled If Global B electrical architecture Then (Run/Crank or Accessory) Else (Sensor Bus Relay On AND Sensor Bus Relay Fault Active) ECM Crank Control Battery Voltage	1 1 TRUE TRUE FALSE TRUE >= 6.60 Volts	26 failed samples out of 30 samples in 12.50 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Pump "A" Speed Out of Range Low	P3077	This diagnostic detects if the actual speed is out of range low. If the enable criteria are met and the actual speed is below a calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement criteria are met.Detects when the coolant pump speed is out of range low	Pump Feedback Speed	<= -1.00 RPM	Diagnostic is Enabled All of the following criteria are met for 12V System Voltage PECR_AuxCoolPmpSpdActl_FoI PECR_AuxCoolPmpSpdActl_Av	 >= 1.00 s > 11.00 V (with hysteresis disable < 10.00 V) = Not Active = Not Active	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Pump "A" Speed Out of Range High	P3078	This diagnostic detects if the actual speed is out of range high. If the enable criteria are met and the actual speed is above a calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a FAIL and if not it will report a PASS. The diagnostic will continue to report as long as the enablement criteria are met.	Pump Feedback Speed	>= 4,001.00 RPM	Diagnostic is Enabled All of the following criteria are met for 12V System Voltage PECR_AuxCoolPmpSpdActl_FoI PECR_AuxCoolPmpSpdActl_Av	 >= 1.00 s > 11.00 V (with hysteresis disable < 10.00 V) = Not Active = Not Active	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Pump Motor Current Out Of Range High	P30AE	This DTC indicates a out of range high failure of the pump motor current.	Actual Motor Current	> 12.00 A	Pump H/W present Diagnostic enabled **************************** Actual pump speed **************************** Powertrain relay voltage Or WCP direct connected too Batt (Coolant Temp OR OBD Coolant enable Criteria) AND (Coolant Temp OR OBD max Coolant Temp achieved) **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** > 1,000 rpm **************************** >=11.0 Volts False > 40.00 C =TRUE <= 126.00 C =FALSE ****************************	8 failures out of 10 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Pump Motor Current Out Of Range Low	P30AF	This DTC indicates a out of range low failure of the pump motor current. Two fault paths are considered. When pump is commanded with pump speed > 0 and commanded pump speed = 0.	Actual Motor Current For more than	< -0.10 A > 5.00 sec	Pump H/W present Diagnostic enabled **************************** Actual pump speed **************************** Powertrain relay voltage Or WCP direct connected too Batt (Coolant Temp OR OBD Coolant enable Criteria) AND (Coolant Temp OR OBD max Coolant Temp achieved) **************************** - Pump enabled - Engine does not crank - Diagnostic system not disabled - No Fault active ICP_CWP_LcFA ICP_CWP_Rsp_FoFA	True True **************************** > 1,000 rpm **************************** >=11.0 Volts False > 40.00 C =TRUE <= 126.00 C =FALSE ****************************	8 failures out of 10 samples 1000ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 1	P30D6	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 3	P30D8	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 4	P30D9	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 5	P30DA	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 6	P30DB	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 7	P30DC	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 8	P30DD	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Rail Pressure Sensor 2 Signal Message Counter Incorrect	P30DE	This DTC detects when the synchronization with the diagnostic feedback protocol is lost for the entire protocol period.	The state of the diagnostic feedback prtocol is	== *NoSync*	**Rail Pressure Sensor Configuration** Run crank voltage (Starter motor is not engaged OR Starter motor has been engaged for a time OR Run crank voltage No active DTC:	= CeFHPG_e_RPS_Double Track > 11.0V >15,000s > 8.4 V) FHP_RPS_CktFA FHP_RPS2_CktFA	70.00 failures out of 70.00 samples 6.25 ms/samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Out of Range Low [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30EE	The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan1 Speed	< = -110.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Serial data Lost communication Fault Active g] LIN Serial data Continuous Operation Fault Active	a] ==1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 Out of Range High [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30EF	The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan1 Speed	> = 4,000.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus serial data Continuous Operation Fault Active	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 2 Out of Range Low [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30F0	The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan2 Speed	< = -110.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Serial data Lost communication Fault Active g] LIN Serial data Continuous Operation Fault Active	a] ==1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 2 Out of Range High [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30F1	The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan2 Speed	> = 4,000.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus serial data Continuous Operation Fault Active	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 3 Out of Range Low [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30F2	The reported actual fan speed in RPM exceeds an lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan3 Speed	< = -110.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Serial data Lost communication Fault Active g] LIN Serial data Continuous Operation Fault Active	a] ==1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 3 Out of Range High [LIN Bus Electric PWM Fans Only - Internal or External controller]	P30F3	The reported actual fan speed in RPM exceeds an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed	Measured LIN Fan3 Speed	> = 4,000.00 rpm	a] Diagnostic Enabled b] Configuration calibration for number of fans c] Diagnostic System Disabled d] Battery Voltage In Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active g] LIN Bus serial data Continuous Operation Fault Active	a] == 1.00 [True if 1; False if 0] b] >= 1 unit c] <>True d] > 11.00 volts e] == TRUE f] <>True g] <>True	16.00 failures out of 20.00 samples; 1000 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
P3186 (Internal Control Module Security Peripheral Performance)	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	3.00	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Performance - Under Pressure	P3187	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	> Threshold [Supporting Table] **P3187_Threshold**	a) Diagnostic is .. b) Timer - Engine Running Minimum c1) Fuel Flow Rate Valid c2) Ambient Air Pressure Value Defaulted c3) Fault bundle FDB_FuelPresSnsrCktFA c4) Reference Voltage Fault Status [DTC P0641] c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [DTC P20CD] c6) Fuel Pres Sensor Performance Fault Active [DTC P018B] c7) Use Calculated Flow Performance Fault Thresholds c8) Engine Speed Status Valid c9) Fault bundle FAB_FuelPmpCktFA c10) Fuel Control Enable Fault Active [DTC P12A6] c11) Fuel Pump Driver Module OverTemp Fault	a) Enabled b) >= 40.00 seconds c1)== TRUE c2) == False c3) == False c4) == False c5) == False c6) == False c7) == False c8] ==TRUE c9] == False c10) == False c11) == False	1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Active [DTC P1255]			
					c12) Fuel Pump Speed Fault Active [DTCP129F]	c12) == False		
					c13) CAN Sensor Bus message $0C3 Comm Fault [DTC P165C]	c13) == False		
					c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [DTC U18A7]	c14] == False		
					c15) Sensor Configuration [is Wired To FTZM?]	c15) == CeFDBR_e_WiredTo_FTZM		
					c16) Sensor Bus Relay On	c16) ==TRUE		
					d) Emissions Fuel Level Low [Message $3FB]	d) == False		
					e) Fuel Control Enable	e) == TRUE		
					f) Fuel Pump Control State	f) == NORMAL		
					g) Input circuit minimum voltage	g) >= 9.00 volts		
					h) High Pres Fuel Pump Mode Management Active	h) == False		
					j) High Pres Fuel Pump Control Mode	j) == Not Disabled Mode AND == Not ZeroFlow Mode		
					ml) Fuel Pmp Speed Command Alive Rolling	ml) == False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Count and Checksum Error [CAN Bus C $0CE] [DTC P14CD] m2) CAN Sensor Bus message $0C3 Available m3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus C $0C3] [DTC U18A7] n) Timer - Diagnostic Enable	 m2) == TRUE m3) == False n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Performance - Over Pressure	P3188	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	<= Threshold [Supporting Table] **P3188_Threshold**	a) Diagnostic is ..	a) Enabled	1 sample / 12.5 millisec	Type B, 2 Trips
					b1) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [Cmd1 DTC U131D]	b1) == False		
					b2) Sensor Configuration	b2) == CeFDBR_e_WiredTo_FTZM		
					b3) Fuel Pres Sensor Serial Comm Ready	b3) == TRUE		
					b4) Fuel Pres Sensor Serial Comm Fault Pending [DTC P14D5]	b4) == False		
					b5) Sensed Fuel Control Enable Serial Comm Ready	b5) == TRUE		
					b6) Sensed Fuel Control Enable Serial Comm Fault Pending	b6) == False		
					c1) Fuel Flow data Valid	c1)== TRUE		
					c2) Ambient Air Pressure Value Defaulted	c2) == False		
					c3) Fuel Pres Sensor Type	c3) == CeFDBR_e_AbsolutePressure		
					c4) Fault Bundle FDB_FuelPresSnsrCktFA	c4) == False		
					c5) Reference Voltage	c5) == False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault Status [DTC P0641]			
					c6) Fuel Pres Sensor Performance Fault Active [DTC P018B]	c6) == False		
					c7) Use Calculated Flow Performance Fault Thresholds	c7) == False		
					c8) Engine Speed Status Valid	c8] ==TRUE		
					c9) Fault bundle FAB_FuelPmpCktFA	c9] == False		
					c10) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c10) == False		
					c11) Fuel Pump Speed Fault Active [DTCP129F]	c11) == False		
					c12) Fuel Pump Duty Cycle Fault Active [DTC P2BB3]	c12) == False		
					c13) CAN Sensor Bus message $0C3 Comm Fault [DTC P165C]	c13) == False		
					c14) Fuel Pres Sensor Serial Comm Fault Active [DTCP14D5]	c14) == False		
					c15) Sensor Bus Relay On	c15) ==TRUE		
					d1) Timer-- Minimum Engine Running	d1) >= 40.00 seconds		
					d2) Diagnostic Data	d2) == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Integrity OK e) Fuel Control Enable f) Fuel Pump Control State g) Instantaneous Fuel Flow h) Fuel Control Enable Fault Active [DTCP12A6] j) Emissions Fuel Level Low [Message $3FB] k) High Pres Fuel Pump Mode Management Enabled l) High Pres Fuel Pump Control Mode m) Diagnostic Data OK n) Timer - Diagnostic Enable	 e) == TRUE f) == Normal AND == NOT Over Response Active g) >= 0.05 gms / sec h) == False j) == False k) == False l) == NOT Disabled Mode AND NOT Over Response Active Mode m) == TRUE n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	3.00 counts (equivalent to 1,000.01 milliseconds) 1,000.01 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	 > 15,000.00 milliseconds > 8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures equals or exceeds before the sample time of is reached	3.00 counts (equivalent to 1,000.01 milliseconds) 1,000.01 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	 > 15,000.00 milliseconds > 8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures equals or exceeds before the sample time of is reached	3.00 counts (equivalent to 1,000.01 milliseconds) 1,000.01 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	> 15,000.00 milliseconds > 8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with TCM	U0101	This DTC monitors for a loss of communication with TCM	Message is not received from controller for Message $01E Message $026 Message $027 Message $02D Message $02E Message $031 Message $032 Message $0BB Message $216 Message $27A Message $452 Message $459	>=418.00 milliseconds >=418.00 milliseconds >=418.00 milliseconds >=10,000.00 milliseconds >=418.00 milliseconds >=418.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=362.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >= 10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the Transfer Case Control Module.	Message is not received from controller for Message $035	>=425.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Reductant Control Module (SCR)	U010E	This DTC monitors for a loss of communication with the Reductant Control Module (SCR).	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $0BF	>10,000.00 milliseconds	If message is on Bus A: U0073 not active			
			Message $255	>10,000.00 milliseconds	If message is on Bus B: U0074 not active			
			Message $291	>10,000.00 milliseconds	If message is on Bus S: U0076 not active			
			Message $292	>10,000.00 milliseconds	CAN channel is requesting full communications			
			Message $296	>10,000.00 milliseconds				
			Message $2A1	>10,000.00 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $2A2	>10,000.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message $2A3	>10,000.00 milliseconds	Accessory mode to off mode not pending			
			Message $2A4	>10,000.00 milliseconds	Battery voltage	>11.00 Volts		
			Message $45D	>10,000.00 milliseconds	Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
			Message $530	>10,000.00 milliseconds	Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds >8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module (Non-OBD Module ID 243).	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips "Emissions Neutral Diagnostics - Type C"
					All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $012	>=475.00 milliseconds	If message is on Bus A: U0073 not active			
			Message $014	>=475.00 milliseconds	If message is on Bus B: U0074 not active			
			Message $015	>= 425.00 milliseconds	If message is on Bus S: U0076 not active			
			Message $017	>=425.00 milliseconds	CAN channel is requesting full communications			
			Message $01A	>=437.50 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $081	>=10,000.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message $082	>=10,000.00 milliseconds	Accessory mode to off mode not pending			
			Message $210	>=575.00 milliseconds	Battery voltage	>11.00 Volts		
			Message $211	>=10,000.00 milliseconds	Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
			Message $219	>=10,000.00 milliseconds	Controller type: OBD Controller			
			Message $21B	>=325.00 milliseconds	If power mode = Run/ Crank: Power Mode is run			
			Message $287	>=10,000.00 milliseconds				
			Message $415	>=700.00 milliseconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $42A Message $57D	>=10,000.00 milliseconds >= 10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Power Steering Control Module	U0131	This DTC monitors for a loss of communication with Power Steering Control Module	Message is not received from controller for Message $023	>=10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Safety Emissions Neutral Diagnostic - Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:	Disabled		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Ride Level Control Module	U0132	This DTC monitors for a loss of communication with Ride Level Control Module	Message is not received from controller for Message $200 Message $2A7 Message $413	 >=325.00 milliseconds >=325.00 milliseconds >= 10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With SADS	U0139	This DTC monitors for a loss of communication with SADS	Message is not received from controller for Message $24E	>=325.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >= 11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with Body Control Module	Message is not received from controller for Message $010 Message $202 Message $203 Message $204 Message $205 Message $228 Message $25E Message $274 Message $284 Message $404 Message $407 Message $409 Message $40A	 >=425.00 milliseconds >=10,000.00 miliseconds >=325.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=325.00 miliseconds >=900.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $40C Message $413 Message $460 Message $461 Message $47E Message $47F Message $481 Message $49F Message $4E7 Message $4EB Message $54D Message $590	>=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=2,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds	If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>= 11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >= 6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Restraints Control Module	U0151	This DTC monitors for a loss of communication with Restraints Control Module	Message is not received from controller for Message $024 Message $0D1 Message $0D2 Message $441 Message $442	 >= 10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=2,000.00 milliseconds >=2,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A:U0073 not active If message is on Bus B:U0074 not active If message is on Bus S:U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5ms loop	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Instrument Panel Cluster (IPC) Control Module	U0155	This DTC monitors for a loss of communication with Instrument Panel Cluster (IPC) Control Module	Message is not received from controller for Message $436	>= 10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A:U0073 not active If message is on Bus B:U0074 not active If message is on Bus S:U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5ms loop	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Active Grill Air Shutter Module A	U0284	This DTC monitors for a loss of communication on the LIN bus 1 with Shutter Module A.	Message is not received from controller for ACM1_Rsp	>=1,250.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled	 Enabled Enabled Disabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Active Grill Air Shutter Module B	U0285	This DTC monitors for a loss of communication on the LIN bus with Shutter Module B.	Message is not received from device for ACM2Rsp_11_C02	>=1,250.00 milliseconds	General Enable Criteria:		LIN bus communication executes in 500ms loop.	Type B, 2 Trips
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN module is initialized			
					Slave is calibrated as present			
					Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled	Disabled		
					All below criteria have been met for	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			
					If calibratable low voltage disable mode is not Never Disabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds >8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With NOx Sensor A	U029D	This DTC monitors for a loss of communication with NOx Sensor A.	Message is not received from controller for Message $0B0 Message $0B1 Message $0B5 Message $0B7 Message $289 Message $293 Message $296 Message $591	 10,000.00 >milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With NOx Sensor B (post catalyst NOx sensor)	U029E	This DTC monitors for a loss of communication with NOx Sensor B.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $0A4	>10,000.00 milliseconds	If message is on Bus A: U0073 not active			
			Message $0B2	>10,000.00 milliseconds	If message is on Bus B: U0074 not active			
			Message $0B6	>10,000.00 milliseconds	If message is on Bus S: U0076 not active			
			Message $0B8	>10,000.00 milliseconds	CAN channel is requesting full communications			
			Message $28B	>10,000.00 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $294	>10,000.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message $297	>10,000.00 milliseconds	Accessory mode to off mode not pending			
			Message $592	>10,000.00 milliseconds	Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds >8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With NOx Sensor C	U02A1	This DTC monitors for a loss of communication with NOx Sensor C.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $0C0	>10,000.00 milliseconds				
					If message is on Bus A: U0073 not active			
			Message $0C2	>10,000.00 milliseconds				
					If message is on Bus B: U0074 not active			
			Message $28D	>10,000.00 milliseconds				
					If message is on Bus S: U0076 not active			
			Message $295	>10,000.00 milliseconds				
					CAN channel is requesting full communications			
			Message $593	>10,000.00 milliseconds				
					Normal CAN transmission on Bus is enabled			
					If bus type is Sensor Bus, sensor bus relay is on			
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds >8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With PM Sensor (Diesel Particulate)	U02A3	This DTC monitors for a loss of communication with the PM Sensor (Diesel Particulate).	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
					All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $3A3	>10,000.00 milliseconds				
					If message is on Bus A: U0073 not active			
			Message $3A5	>10,000.00 milliseconds				
					If message is on Bus B: U0074 not active			
			Message $3A8	>10,000.00 milliseconds				
					If message is on Bus S: U0076 not active			
			Message $3A9	>10,000.00 milliseconds				
					CAN channel is requesting full communications			
			Message $3AA	>10,000.00 milliseconds				
			Message $497	>10,000.00 milliseconds	Normal CAN transmission on Bus is enabled			
					If bus type is Sensor Bus, sensor bus relay is on			
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds >8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communication with Charge Air Cooler Electric Water Pump	U02A9	This DTC monitors for a loss of communication on the LIN bus with the Charge Air Cooler Electric Water Pump.	Message is not received from device for CWP_Rsp_25_C02	 >=2,500.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled	 Enabled Enabled Disabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	>8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transmission Control Module	U0402	This DTC monitors for an error in communication with Transmission Control Module	The signal value of the Alive Rolling Count (ARC),Protection Value (PV),or Checksum (CSUM) of the following signals received over serial data is incorrect for ArcSig_TGI2P_ARC MACSig_TrnsGnrlnfo2_Prtctd ArcSig_TORSP_ARC MACSig_TransOutRotSts_Prtctd ArcSig_TGIP_ARC MACSig_TrnsGnrlnfo_Prtctd ArcSig_TRDP_ARC MACSig_TCMGnrlInfo1_Prtctd ArcSig_TEGP_ARC MACSig_TrnsEstGr_Prtctd ArcSig_TGI3_ARC CSUM_TGI3_CS	8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	>= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				18.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transfer Case Control Module	U0403	This DTC monitors for an error in communication with Transfer Case Control Module	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), of the following signals received over serial data is incorrect for RxArcSig_SAP_ARC MACSig_SecAxl_Prtctd	 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received SIB	U0404	This DTC monitors for an error in communication with SIB	Alive Rolling Count (ARC), of the following signals received over serial data is incorrect for: ArcSig_LS1ISP_ARC	4.00 fail counts out of 10.00 samples counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	>= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Reductant Control Module	U040F	This DTC monitors for an error in communication with the Reductant Control Module.	Alive Rolling Count (ARC),Protection Value (PV), or Checsum(CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			CeSSMR_e_GbRxArcSig_PstSndCatNOxSnsDt2ARC	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			CeSSMR_e_GbCSUM_PstSndCatNOxSnsDt2Chksm	8.00 fail counts out of 18.00 sample counts	Battery voltage	>=11.00 volts		
					Accessory mode to off mode transition not pending	<= 18.00 volts		
			CeSSMR_e_GbRxArcSig_NoxSnsErrPstSndCatARC	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage			
			CeSSMR_e_GbCSUM_NOxSnsErrPstSndCatChksm	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			CeSSMR_e_GbRxArcSig_PstSndCatNOxSnsDt3ARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_PstSndCatNOxSnsDt3Chksm	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbRxArcSig_PstSndCatNOxSnsCmptDtARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_PstSndCatNOxSnsCmptChksm	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Brake System Control Module	U0418	This DTC monitors for an error in communication with Brake System Control Module	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for:	>= 5,000.00 milliseconds	Executes in 12.5ms loop.	Type A, 1 Trips
			ArcSig_BSIS2P_ARC:	8.00 fail counts out of 18.00 sample counts	Battery voltage	>=11.00 volts		
			MACSig_BrkSysInfoSts2_Prtctd_MAC:	8.00 fail counts out of 18.00 sample counts		<= 18.00 volts		
			ArcSig_CSBTP_ARC:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			MACSig_ChsSysBrkTrq_Prtctd_MAC:	8.00 fail counts out of 18.00fsample counts	If controller is a non-OBD controller then battery voltage Controller type: OBD Controller			
			ArcSig_BSIRP_ARC:	8.00 fail counts out of 18.00 sample counts				
			MACSig_EBCMGnrlInfo1_Prtctd_MAC:	8.00 fail counts out of 18.00 sample counts				
			ArcSig_BSISP_ARC:	3.00 fail counts out of 10.00 sample counts				
			MACSig_BrkSysInfoSts_Prtctd_MAC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_WRDSP_ARC	3.00 fail counts out of 10.00 sample counts				
			MACSig_EBCMGnrlInfo2_Prtctd_MAC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_DMCP_ARC	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			MACSig_EBCMGnrlInfo3_Prtctd_MAC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_BSIR3P_ARC	3.00 fail counts out of 10.00 sample counts				
			MACSigJBrkSysInfoReqs3_Prtctd_MAC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_EPBSP_ARC	3.00 fail counts out of 10.00 sample counts				
			MACSig_ElecPrkBrkSts_Prtctd_MAC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_BSSIP_ARC	3.00 fail counts out of 10.00 sample counts				
			MACSig_BrkSysStslnfo_Prtctd_MAC	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Power Steering Control Module	U0420	This DTC monitors for an error in communication with the Power Steering Control Module.	The signal value of the Alive Rolling Count (ARC) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type C, No SVS
			RxArcSig_SWIP_ARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			MACSig_StrgWhlInfo_Prtctd_MAC:	8.00 fail counts out of 18.00 sample counts	Battery voltage	>= 11.00 volts		
					Accessory mode to off mode transition not pending	<= 18.00 volts		
					If controller is a non-OBD controller then battery voltage			
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Ride Level Control Module	U0421	This DTC monitors for an error in communication with the Ride Level Control Module	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSUM), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop	Type C, No SVS
					All the following conditions are met for:	>= 5,000.00 milliseconds		
			ArcSig_ALCGI_ARC	3.00 fail counts out of 10.00 sample counts	Battery voltage	>=11.00 volts		
					Accessory mode to off mode transition not pending	<= 18.00 volts		
			ArcSig_ALCGI_ARC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_VLCGI_ARC	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage			
			PvSig_VLCGI_PV	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			ArcSig_VLCGI2_ARC	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Body Control Module	U0422	This DTC monitors for an error in communication with the Body Control Module	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSLIM), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop	Type B, 2 Trips
					All the following conditions are met for:	>= 5,000.00 milliseconds		
			ArcSig_BGI3P_ARC	8.00 fail counts out of 18.00 sample counts	Battery voltage	>=11.00 volts		
						<= 18.00 volts		
			MACSig_BdyGenInfo3_Prtctd	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			ArcSig_RIP_ARC	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage			
			MACSig_RelImblz_Prtctd	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			ArcSig_SPMP_ARC	3.00 fail counts out of 10.00 sample counts				
			MACSig_SysPwrMode_Prtctd	3.00 fail counts out of 10.00 sample counts				
			ArcSig_BGI1P_ARC	3.00 fail counts out of 10.00 sample counts				
			MACSig_BdyGenInfo1_Prtctd	3.00 fail counts out of 10.00 sample counts				
			ArcSig_CCHI_ARC	3.00 fail counts out of 10.00 sample counts				
			CSUM_CCHI_CS	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ArcSig_RTPP_ARC	3.00 fail counts out of 10.00 sample counts				
			MACSig_BCMGnrlInfo1_ Prtctd	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Suspension Control Module B	U043A	This DTC monitors for an error in communication with Suspension Control Module B	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSUM), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop	Type C, No SVS
					All the following conditions are met for:	>= 5,000.00 milliseconds		
			ArcSig_SADSVTSLP_ARC	3.00 fail counts out of 10.00 sample counts	Battery voltage	>=11.00 volts		
					Accessory mode to off mode transition not pending	<= 18.00 volts		
			MACSig_SemiAtvDmpgSysVhTpSpdLim_Prtctd	3.00 fail counts out of 10.00 sample counts				
					If controller is a non-OBD controller then battery voltage			
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Gateway A	U0447	This DTC monitors for an error in communication with Gateway A.	The signal value of the Alive Rolling Count (ARC),of the following signals received over serial data is incorrect times for: RxArcSig_BSPMP_ARC MACSig_BkupSysPwrMode_Prtctd	 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Restraints Control Module	U0452	This DTC monitors for an error in communication with Restraints Control Module.	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSLIM), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type C, No SVS
					All the following conditions are met for:	>= 5,000.00 milliseconds		
			ArcSig_IMUSR2_ARC	4.00 fail counts out of 10.00 sample counts				
					Battery voltage	>=11.00 volts		
			CSUM_IMUSR2_CS	4.00 fail counts out of 10.00 sample counts		<= 18.00 volts		
			ArcSig_IMUSR1P_ARC	4.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
			MACSig_IMUSnsrRw1_Prtctd	4.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage			
			ArcSig_ORIP_ARC	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			MACSig_OccptRstrntInfo_Prtctd	3.00 fail counts out of 10.00 sample counts				
			ArcSig_PCIP_ARC	3.00 fail counts out of 10.00 sample counts				
			MACSig_PstClsnInfo_Prtctd	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Telematics Communication Interface Control Module	U0499	This DTC monitors for an error in communication with Telematics Communication Interface Control Module	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSLIM), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type C, No SVS
					All the following conditions are met for:	>= 5,000.00 milliseconds		
			CeSSMR_e_GbRxArcSig_ESVTSP_ARC	3.00 fail counts out of 10.00 sample counts	Battery voltage	>=11.00 volts		
			MACSig_EnhdSrvsVhTpSpPrtctd	3.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending	<= 18.00 volts		
					If controller is a non-OBD controller then battery voltage			
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Particu late Matter Sens or A	U04A4	This DTC monitors for an error in communication with Particulate Matter Sensor A	Alive Rolling Count (ARC),Protection Value (PV), or Checsum(CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type C, No SVS
			ArcSig_SootSnsStatARC	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			ArcSig_SootSnsEltrdSuVoltARC	3.00 fail counts out of 10.00 sample counts	Battery voltage	>=11.00 volts		
			ArcSig_SootSnsEltrdCrntARC	3.00 fail counts out of 10.00 sample counts		<= 18.00 volts		
					Accessory mode to off mode transition not pending			
			PvSig_SootSnsEltrdCrntPVai	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage			
			PvSig_SootSnsEltrdSuVoltPVal	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			PvSig_SootSnsStatPVal	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsOutErrARC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsInErrARC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsHtrDtyCycARC	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsInErrProtVal	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsHtrDtyCycPVal	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsOutErrPro	3.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			tVal	10.00 sample counts				
			ArcSig_SootSnsSplyVltERARC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsEltrdTempARC	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsSplyVltERPVal	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsEltrdTempPVal	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsRgStpTmpARC	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsHtrResARC	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsHtrResPVal	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsRgStpTmpPVal	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsTmpCmElCuRC	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsTmpCmElCuPVal	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsrCtlUlnfoARC	3.00 fail counts out of 10.00 sample counts				
			CSUM_SootSnsrCtlUlnfoChksm	3.00 fail counts out of 10.00 sample counts				
			ArcSig_SootSnsPrbCrntSensFtrARC	3.00 fail counts out of 10.00 sample counts				
			PvSig_SootSnsPrbCrntSe	3.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			nsFtrPVal	10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Active Safety Control Module 1	U053B	This DTC monitors for an error in communication with Active Safety Control Module 1	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSUM), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type C, No SVS
					All the following conditions are met for:	>= 5,000.00 milliseconds		
			ArcSig_ACCBRP_ARC	4.00 fail counts out of 10.00 sample counts				
					Battery voltage	>=11.00 volts		
			MACSig_ACCGnrlInfo1_Prtctd	4.00 fail counts out of 10.00 sample counts				
					Accessory mode to off mode transition not pending	<= 18.00 volts		
			ArcSig_FIMRIMABP_ARC	4.00 fail counts out of 10.00 sample counts				
			MACSig_EOCMGnrlInfo1_Prtctd	4.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage			
			ArcSig_ASPATR A R C	4.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			CSUM_ASPATR_CS	4.00 fail counts out of 10.00 sample counts				
			ArcSig_FCAR_ARC	4.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Active Grill Air Shutter Module A	U0585	This DTC monitors for an error in communication with Active Grill Air Shutter Module A	The signal value of the Alive Rolling Count (ARC) of the following signals received over serial data is incorrect for: ArcSig_ACM1_InitStatARC	 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Active Grill Air Shutter Module B	U0586	This DTC monitors for an error in communication with Active Grill Air Shutter Module B	The signal value of the Alive Rolling Count (ARC) of the following signals received over serial data is incorrect for: ArcSig_ACM2_InitStatARC	 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From DC/DC Converter Control Module A	U0599	This DTC monitors for an error in communication with DC/DC Converter Control Module A	Alive Rolling Count (ARC),Protection Value (PV) of the following signals received over serial data is incorrect for: ArcSig_DCCnvActrVltADCValARC PvSig_DCCnvActrVltADCValPVal ArcSig_DCCCnvCrnkCtlTrmStARC PvSig_DCCCnvCrnkCtlTrmStPVal	 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 8.00 fail counts out of 18.00 sample counts 2.00 fail counts out of 1.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From NOx Sensor A	U059E	This DTC monitors for an error in communication with NOx Sensor A	Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			ArcSig_EngOtNOxSnsDa1ARC	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			PvSig_NOxCnctrEngOutProtVa	8.00 fail counts out of 18.00 sample counts	Battery voltage	>=11.00 volts		
			PvSig_NOSnsStEngOutProtVa	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending	<= 18.00 volts		
			PvSig_EngOtNOxSnSlfDgFdkStPVal	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage Controller type: OBD Controller			
			ArcSig_NOxSnsErrEngOutARC	8.00 fail counts out of 18.00 sample counts				
			CSUM_NOxSnsErrEngOutChkSm	8.00 fail counts out of 18.00 sample counts				
			ArcSig_EngOtNOxSnsDa4ARC	3.00 fail counts out of 10.00 sample counts				
			PvSig_NOxHtRsMsdEnOt2PVal	3.00 fail counts out of 10.00 sample counts				
			ArcSig_EngOtNOxSnsDa6ARC	3.00 fail counts out of 10.00 sample counts				
			CSUM_EngOtNOxSnsDa6Chksm	3.00 fail counts out of 10.00 sample counts				
			ArcSig_NOxSnsCmptInfEngOutARC	3.00 fail counts out of 10.00 sample counts				
			PvSig_NOxSnsCmptInfEn	3.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			gOutPVal	10.00 sample counts				

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Invalid Data Received From NOx Sensor B	U059F	This DTC monitors for an error in communication with NOx Sensor B	Alive Rolling Count (ARC),Protection Value (PV), or Checsum(CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			ArcSig_PstCatNOxSnsDa 1ARC	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			PvSig_NOxCntrnPstCatys tPVa	8.00 fail counts out of 18.00 sample counts	Battery voltage	>=11.00 volts		
			PvSig_NOxSnsSPstCatly stPVa	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending	<= 18.00 volts		
			PvSig_PstCtNOxSnsSlfD gFdkStPVal	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage Controller type: OBD Controller			
			ArcSig_PstCatNOxSnsDa 2ARC	8.00 fail counts out of 18.00 sample counts				
			PvSig_PstCtNOxSnsrSlfD gRsltPVal	3.00 fail counts out of 10.00 sample counts				
			ArcSig_NOxSnsErrPstCat ARC	8.00 fail counts out of 18.00 sample counts				
			CSUM_NOxSnsErrPstCat Chksm	8.00 fail counts out of 18.00 sample counts				
			ArcSig_PstCatNOxSnsDa 4ARC	3.00 fail counts out of 10.00 sample counts				
			PvSig_NOxHtRsMsdPstC 2PVal	3.00 fail counts out of 10.00 sample counts				
			ArcSig_PstCatNOxSnsDa 6ARC	3.00 fail counts out of 10.00 sample counts				
			CSUM_PstCatNOxSnsDa	3.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			6Chksm ArcSig_NOxSnsCmptlnfPstCatARC PvSig_NOxSnsCmptlnfPstCatPVal	10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From NOx Sensor C	U05A8	This DTC monitors for an error in communication with NOx Sensor C	Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			ArcSig_PstSndCatNOxSnsDt2ARC	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			CSUM_PstSndCatNOxSnsDt2Chksm	8.00 fail counts out of 18.00 sample counts	Battery voltage	>=11.00 volts		
			ArcSig_NoxSnsErrPstSndCatARC	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending	<= 18.00 volts		
			CSUM_NOxSnsErrPstSndCatChksm	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage Controller type: OBD Controller			
			ArcSig_PstSndCatNOxSnsDt3ARC	3.00 fail counts out of 10.00 sample counts				
			CSUM_PstSndCatNOxSnsDt3Chksm	3.00 fail counts out of 10.00 sample counts				
			ArcSig_PstSndCatNOxSnsCmptDtARC	3.00 fail counts out of 10.00 sample counts				
			CSUM_PstSndCatNOxSnsCmptChksm	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Charge Air Cooler Water Pump Motor	U05AA	This DTC monitors for an error in communication with the Charge Air Cooler Water Pump Motor	The signal value of the Alive Rolling Count (ARC) of the following signals received over serial data is incorrect for: CeSSMR_e_GbRxArcSig_CACPmpARC	 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Mass or Volume Air Flow Sensor A	U060F	This DTC monitors for a loss of communication on the LIN bus 2 with Mass or Volume Air Flow Sensor A.	Message is not received from controller for		General Enable Criteria:		LIN bus communication executes in 500ms loop	Type B, 2 Trips
					Diagnostic is enabled	Enabled		
			MAF1_Press_Rsp	>= 87.50 milliseconds				
					LIN channel is enabled	Enabled		
			MAF1_TmpHum_Rsp	>= 250.00 milliseconds	LIN module is initialized			
					Slave is calibrated as present			
					All below criteria have been met for	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Engine Coolant Bypass Valve C	U0617	Communication Check This DTC will detect if SENT communication was lost for the Engine Coolant Bypass Valve C Sensor	If any of the following conditions are met a failure count will be recorded: **Condition 1:** HWIO message faults **Condition 2:** Pulse count delta AND Message age **Condition 3:** Voltage on SENT pin is greater than a controller specific threshold AND Message age **Condition 4:** Voltage on SENT pin is less than a controller specific threshold AND Message age	= No Fault >0 > 6.25 ms > 6.25 ms > 6.25 ms	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking Engine Diag System	= True = True = Enabled	4 seconds out of a 5 seconds window	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Engine Coolant Bypass Valve D	U0618	This DTC monitors for a loss of communication on the LIN bus with Engine Coolant Bypass Valve D	Message is not received from controller for		General Enable Criteria:		LIN bus communication executes in 500ms loop	Type A, 1 Trips
					Diagnostic is enabled	Enabled		
			BRVRsp	>= 250.00 milliseconds				
					LIN channel is enabled	Enabled		
					LIN module is initialized			
					Slave is calibrated as present			
					Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled	Disabled		
					All below criteria have been met for	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			
					If calibratable low voltage disable mode is not Never Disabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
						> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for	>8.41 Volts		
					Or Run/Crank ignition voltage	>= 6.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage			
						Disabled		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
						>=11.00 Volts		
					Power Mode is not run/ crank			
					Battery voltage			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of Communication with Auxiliary Electric Water Pump	U0623	This DTC monitors for a loss of communication on the LIN bus 1 with the Auxiliary Electric Water Pump	Message is not received from controller for		General Enable Criteria:		LIN bus communication executes in 500ms loop	Type B, 2 Trips
					Diagnostic is enabled	Enabled		
			AWP_Rsp	>=2,500.00 milliseconds	LIN channel is enabled	Enabled		
					LIN module is initialized Slave is calibrated as present			
					Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled			
					All below criteria have been met for	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >= 6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 1 LIN Communication Failure	U0632	This DTC monitors for a loss of communication on the LIN bus 1 with Cooling Fan 1.	Message is not received from controller for CFM1RSP	>=2,500.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled	Enabled >=0.00 milliseconds >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >= 6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 2 LIN Communication Failure	U0633	This DTC monitors for a loss of communication on the LIN bus 1 with Cooling Fan 2.	Message is not received from controller for CFM2_RSP	>=2,500.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled	 Enabled Enabled >=0.00 milliseconds >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >= 6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Engine Coolant Flow Control Valve Position Sensor	U063F	This monitor checks whether communication with the Engine Coolant Flow Control Valve SENT position sensor is lost.	A malfunction is detected if any of the following conditions occur (based on information provided by HWIO): **Condition 1:** (a) Time since last valid SENT message higher than a threshold AND (b) SENT position protocol status **Condition 2:** (a) Time since last valid SENT message higher than a threshold AND (b) SENT position protocol status **Condition 3:** SENT message faults **Condition 4:** (a) Time since last valid SENT message higher than a threshold AND (b) SENT pulse counter has been updated	> 6.25 [ms] == STEADY LOW > 6.25 [ms] == STEADY HIGH > 0 > 6.25 [ms]	Test enabled Powertrain relay voltage Engine cranking Diagnostic system enabled	== 1.00 > 11.00 [V] == False == True	20.00 fails out of 25.00 samples Sampling rate: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cooling Fan 3 LIN Communication Failure	U067C	This DTC monitors for a loss of communication on the LIN bus with Cooling Fan 3.	Message is not received from device for CFM3_Rsp_2D_C04	>=2,437.50 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage	 Enabled Enabled >=0.00 seconds >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Communication CAN Bus 1 Off	U1002	This DTC monitors for a Central Gateway Module Communication CAN Bus 1 Off as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 1 Off DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Communication CAN Bus 3 Off	U1004	This DTC monitors for a Central Gateway Module Communication CAN Bus 3 Off as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 3 Off DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Communication CAN Bus 5 Off	U1006	This DTC monitors for a Central Gateway Module Communication CAN Bus 5 Off as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Communication CAN Bus 5 Off DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Module PT Private CAN Bus Enable Diagnostic Status	U100B	Detects if PT private CAN wake up wire is shorted to low or open circuited.	PT sensor bus wake up wire voltage	<= 1.5 Volts	Iginition Run/Crank wired signal = DTC Type (0 = disabled)	Run or Run/Crank active (high level) 6.00	4.5 seconds in 5.5 second window	DTC Type B, Two Trips, MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Cooling Fan Motor 1	U1314	This DTC monitors for an error in communication with Cooling Fan Motor 1.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			PrplCoolFn1_ARC:	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>=11.00 volts		
					Accessory mode to off mode transition not pending	<= 18.00 volts		
					If controller is a non-OBD controller then battery voltage			
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Cooling Fan Motor 2	U1315	This DTC monitors for an error in communication with Cooling Fan Motor 2	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSLIM), of the following signals received over serial data is incorrect for: ArcSig_PrplCoolFn2_ARC	 3.00 fail counts of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Cooling Fan Motor 3	U1316	This DTC monitors for an error in communication with Cooling Fan Motor 3	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSLIM), of the following signals received over serial data is incorrect for: ArcSig_PrplCoolFn2_ARC	 3.00 fail counts of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Mass Air Flow Sensor 1	U1319	This DTC monitors for an error in communication with Mass Air Flow Sensor 1	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSLIM), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			ArcSig_PAM2TempHmdty ARC	3.00 fail counts of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>=11.00 volts		
			ArcSig_PAM2PresARC	8.00 fail counts of 18.00 sample counts		<= 18.00 volts		
					Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage			
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Fuel Tank Zone Module	U131D	This DTC monitors for an error in communication with Fuel Tank Zone Module	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSUM), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			CeSSMR_e_GbRxArcSig_FTZMInfo1ARC	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			CeSSMR_e_GbCSUM_FTZMInfolChksm	8.00 fail counts out of 18.00 sample counts	Battery voltage	>=11.00 volts		
			CeSSMR_e_GbRxArcSig_FTZMInfo11ARC	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending	<= 18.00 volts		
			CeSSMR_e_GbCSUM_FTZMInfolIChksm	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage Controller type: OBD Controller			
			CeSSMR_e_GbRxArcSig_FTZMInfo8ARC	8.00 fail counts out of 18.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo8Chksm	8.00 fail counts out of 18.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo2ARC	8.00 fail counts out of 18.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo2Chksm	8.00 fail counts out of 18.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo12ARC	8.00 fail counts out of 18.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfol2Chksm	8.00 fail counts out of 18.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeSSMR_e_GbRxArcSig_FTZMInfo14ARC	8.00 fail counts out of 18.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo14Chksm	8.00 fail counts out of 18.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo3ARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo3Chksm	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo4ARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo4Chksm	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo5ARC	4.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo5Chksm	4.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo16ARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo16Chksm	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo6ARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo6Chksm	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo7ARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo7Chksm	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeSSMR_e_GbRxArcSig_FTZMInfo9ARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo9Chksm	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbRxArcSig_FTZMInfo13ARC	3.00 fail counts out of 10.00 sample counts				
			CeSSMR_e_GbCSUM_FTZMInfo13Chksm	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 1	U1345	This DTC monitors for a LIN bus off condition on LIN Bus 1.	Loss of Communication Method: The total number of diagnostic enabled slave nodes on LIN Bus 1 Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	 = Total number of slave nodes on LIN Bus 1 that have reported lost communications DTCs >= 10.00 counts	Loss of Communication Method: Diagnostic is enabled LIN channel is enabled LIN module is initialized All below criteria have been met for: LIN channel is requesting full communications Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	 Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Dependent on bus loading.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	>15,000.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled			
					LIN channel is enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					LIN channel is requesting full communications			
					LIN module is initialized			
					The following criteria have been enabled for:	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 2	U1346	This DTC monitors for a LIN bus off condition on LIN Bus 2.	Loss of Communication Method: The total number of diagnostic enabled slave nodes on LIN Bus 2 Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	= Total number of slave nodes on LIN Bus 2 that have reported lost communications DTCs >= 10.00 counts	Loss of Communication Method: Diagnostic is enabled LIN channel is enabled LIN module is initialized All below criteria have been met for LIN channel is requesting full communications Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII:	Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Dependent on bus loading.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or	> 15,000.00 milliseconds		
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled			
					LIN channel is enabled			
					LIN channel is requesting			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					full communications			
					LIN module is initialized			
					The following criteria have been enabled for:	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication LIN Bus 3 Off	U1347	This DTC monitors for a LIN bus 3 off condition.	Loss of Communication Method:		Loss of Communication Method:		Dependent on bus loading.	Type A, 1 Trips
			The total number of diagnostic enabled slave nodes on LIN Bus 3	= Total number of slave nodes on LIN Bus 3 that have reported lost communications DTCs	Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN module is initialized			
			Or					
					The following criteria have been enabled for:	>= 5,000.00 milliseconds		
			LIN channel Wakeup Method:					
					LIN channel is requesting full communications			
			LIN channel wakeup repetition counter	>= 10.00 counts				
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown not impending Power Mode is not run/ crank Battery voltage LIN channel Wakeup Method: Diagnostic is enabled LIN channel is enabled LIN channel is requesting	>=11.00 Volts >=9.00 Volts > 15,000.00 milliseconds >8.41 Volts >=6.41 Volts Disabled >=11.00 Volts Enabled Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					full communications LIN module is initialized The following criteria have been enabled for: Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 4	U1348	This DTC monitors for a LIN bus 4 off condition.	Loss of Communication Method:		Loss of Communication Method:		Dependent on bus loading.	Type B, 2 Trips
			The total number of diagnostic enabled slave nodes on LIN Bus 4	= Total number of slave nodes on LIN Bus 4 that have reported lost communications DTCs	Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN module is initialized			
			Or		The following criteria have been enabled for:	>= 5,000.00 milliseconds		
			LIN channel Wakeup Method:		LIN channel is requesting full communications			
			LIN channel wakeup repetition counter	>= 10.00 counts	Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds >8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN channel is requesting			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					full communications			
					LIN module is initialized			
					The following criteria have been enabled for:	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Block Coolant Valve Actuator	U1379	This DTC monitors for an error in communication with the Block Coolant Valve Actuator.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			BRV-ARC:	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>=11.00 volts		
					Accessory mode to off mode transition not pending	<= 18.00 volts		
					If controller is a non-OBD controller then battery voltage			
					Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Received Invalid Data From Body Control Module	U137B	Detects invalid data coming from the BCM.	Invalid Data Received from BCM	Invalid MAC, Alive Rolling Count, or Protection Value	CAN Communication System Voltage DTC Type (0 = disabled)	Enabled Voltage in Range 6.00	XofY threshold: 8/10	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Received Invalid Data from Central Gateway Module	U137C	Detects invalid data coming from the CGM.	Invalid Data Received from CGM	Invalid MAC, Alive Rolling Count, or Protection Value	CAN Communication System Voltage DTC Type (0 = disabled)	Enabled Voltage in Range 6.00	XofY threshold: 8/10	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Received Invalid Data from ECM	U137D	Detects invalid data coming from the ECM.	Invalid Data Received from ECM	Invalid MAC, Alive Rolling Count, or Protection Value	CAN Communication System Voltage DTC Type (0 = disabled)	Enabled Voltage in Range 6.00	XofY threshold: 8/10	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Auxiliary Water Pump Motor	U137E	This DTC monitors for an error in communication with Auxiliary Water Pump Motor	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC) or Checksum (CSUM), of the following signals received over serial data is incorrect for: ArcSig_AuxCoolPmpARC	 3.00 fail counts of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >=11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Invalid Data Received from Body Control Module	U137F	This DTC monitors for a Central Gateway Module Invalid Data Received from Body Control Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Invalid Data Received from Body Control Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module BCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transmission Control Module on Engine Control Module LIN Bus 1	U1600	This DTC monitors for a loss of communication on the LIN bus 1 with Transmission Control Module on Engine Control Module	Message is not received from controller for TCM_RSP	>= 150.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled	 Enabled Enabled >=0.00 milliseconds >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or			
					Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 6.41 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A on CAN 2	U1608	This DTC monitors for a loss of communication with Gateway A on CAN 2	Message is not received from controller for Message $425	>=10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >= 11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Central Gateway Module on CAN Bus 3	U1609	This DTC monitors for a loss of communication with Central Gateway Module on CAN Bus 3	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
					All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $209	>=10,000.00 milliseconds				
			Message $20D	>=325.00 miliseconds	If message is on Bus A: U0073 not active			
			Message $457	>=10,000.00 miliseconds	If message is on Bus B: U0074 not active			
			Message $458	>=10,000.00 miliseconds	If message is on Bus S: U0076 not active			
			Message $45A	>=10,000.00 miliseconds	CAN channel is requesting full communications			
					Normal CAN transmission on Bus is enabled			
					If bus type is Sensor Bus, sensor bus relay is on			
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank: Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:	Disabled		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with External Object Calculating Module 1 - Processor 1 on CAN Bus 2	U1615	This DTC monitors for a loss of communication with External Object Calculating Module 1 - Processor 1 on CAN Bus 2	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type C, No SVS
					All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $089	>=325.00 milliseconds				
					If message is on Bus A: U0073 not active			
			Message $08A	>=325.00 miliseconds				
					If message is on Bus B: U0074 not active			
			Message $0BE	>=825.00 miliseconds				
					If message is on Bus S: U0076 not active			
					CAN channel is requesting full communications			
					Normal CAN transmission on Bus is enabled			
					If bus type is Sensor Bus, sensor bus relay is on			
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank: Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	 >= 11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Fuel Pump Driver Control Module	U18A2	This DTC monitors for a loss of communication with Fuel Pump Driver Control Module	Message is not received from controller for Message $0C3 Message $0C4 Message $0CB Message $0CC Message $1E6 Message $2C1 Message $2D7 Message $2D9 Message $3C8 Message $3EB Message $3EC Message $3EE Message $4C6	>=10,000.00 milliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>= 11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Sensor CAN Bus	U18C6	Detects that CAN serial data communication has been lost with the ECM.	Powertrain Sensor Bus Message $1E2 OR $1E8	Undetected	Ignition Run/Crank Voltage Ignition The DTC type must be set to 6 to enable a type B DTC:	11V< RC Volt < 32V = Run/Crank OR = Accessory 6.00	1.0 second	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Expansion CAN Bus	U18C7	Detects that CAN serial data communication has been lost with the ECM.	CAN frames sent from the ECM on CAN3 (Global B) or Powertrain Expansion (Global A) not received.	Undetected	CAN Communication System Voltage DTC Type (0 = disabled)	Enabled In Range 6.00	10 seconds	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	U18D2	This DTC monitors for a loss of communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
			Message $1E4	>=1,000.00 milliseconds	All below criteria have been met for	>= 5,000.00 milliseconds		
			Message $1EC	>=10,000.00 miliseconds	If message is on Bus A: U0073 not active			
			Message $2F3	>=10,000.00 miliseconds	If message is on Bus B: U0074 not active			
			Message $32D	>=500.00 miliseconds	If message is on Bus S: U0076 not active			
			Message $4C4	>=10,000.00 miliseconds	CAN channel is requesting full communications			
					Normal CAN transmission on Bus is enabled			
					If bus type is Sensor Bus, sensor bus relay is on			
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank: Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: OBDII			
					IfOBDII: Run/Crank ignition voltage	>= 11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:	Disabled		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	U18D3	This DTC monitors for a loss of communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	Message is not received from controller for Message $0BC Message $0BD Message $0C1 Message $0CF	 >=500.00 milliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds >=10,000.00 miliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>= 11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with DC to DC Converter on Powertrain Sensor Bus	U18E2	This DTC monitors for a loss of communication with DC to DC Converter on Powertrain Sensor Bus	Message is not received from controller for Message $0A8 Message $1C9	 >=10,000.00 milliseconds >=10,000.00 miliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>= 11.00 Volts >=9.00 Volts > 15,000.00 milliseconds > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Key Table Not Provisioned / Authoritative Counter At Maximum	U1960	This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value	During controller initialization:
			
			IF (Any Security Peripheral Key Slot reports as Empty)
			-OR-
			(Any Authoritative Counter is at MAX value)
			
			During controller operation:
			
			IF (A Security Peripheral Key Slot reports as Empty)
			-OR-
			(An Authoritative Counter is at MAX value)
					Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1961 (Security Peripheral Performance)	U1961	This DTC indicates that the ECU security peripheral has reported that it has failed.	The ECU security peripheral reports that the security peripheral hardware has failed.		Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1962 (Unable to Authenticate Serial Data Message)	U1962	This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle.	Message authentication on a single key slot has failed a configurable number of times.	KeSSAR_Cnt_SecKey SlotFailLimit	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Key Table Not Provisioned	U1970	Detects when Key Slot Provision indicates security peripheral is not legitimate	1) The Authoritative Counter reaches its maximum value. 2) Any single Key Slot Provision State Flag for Key 2 through Key <n> is equal to a value of 0 while the MEC is equal to 0. 3) The DTC can be also set upon receipt of ERC_KEY_EMPTY from the security peripheral (SECP).		CAN Communication =	Enabled	1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power-up. 3) Monitored while RID 0x0200: Provision Security Peripheral General Keys is being executed.	Type A, one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Unable to Authenticate Serial Data Message	U1972	Detects error in MAC caused by Security Peripheral hardware	A Message Authentication Code results in failed verification based on the programmed key table.	Three consecutive failed authentication in a key slot	CAN Communication DTC Type (0 = disabled)	= Enabled 6.00		DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Vehicle Identification Number of First Vehicle Not Programmed	U1978	This DTC checks that the VIN of the first vehicle is correctly written	At least one of the programmed VIN of the first vehicle digits	Not a valid ASCII value	KeVIND_b_VI N_O FV_N P _EnableDTC	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Self-Learn Did Not Execute	U197B	This DTC monitors for a Central Gateway Module Self-Learn Did Not Execute error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Self-Learn Did Not Execute DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module ECU Identification List Memory Fault	U197C	This DTC monitors for a Central Gateway Module ECU Identification List Memory Fault error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module ECU Identification List Memory Fault DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Self-Learn Invalid Due To VIN Mismatch	U197D	This DTC monitors for a Central Gateway Module Self-Learn Invalid Due To VIN Mismatch error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Self-Learn Invalid Due To VIN Mismatch DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Key Table Not Provisioned	U1982	This DTC monitors for a Central Gateway Module Key Table Not Provisioned error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Key Table Not Provisioned DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Security Peripheral Performance – Performance or Incorrect Operation	U1983	This DTC monitors for a Central Gateway Module Security Peripheral Performance - Performance or Incorrect Operation error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Security Peripheral Performance - Performance or Incorrect Operation DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Unable To Authenticate Serial Data Message	U1984	This DTC monitors for a Central Gateway Module Unable To Authenticate Serial Data Message error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Unable To Authenticate Serial Data Message DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Zone Module Lost Communication with Fuel Level Sensor	U2200	DTC will detect loss of communication with primary fuel level sender signal from fuel tank zone module.	Fuel level signal is missing	>= 16.00 counts	a] Diagnostic enabled b] Device feedback faulted c]Diagnostic system disabled	a] = 0.00 [1.00 = TRUE; 0 <> TRUE]	16.00 failures of 20.00 samples 250 millisec / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Lost Communication with Central Gateway Module	U2201	Detects that CAN serial data communication has been lost with the CGM on CAN 3.	CAN frames originating from the CGM not received.	Begins to mature when message has not arrived in 2.5x nominal transmit rage.	CAN Communication DTC Type (0 = disabled)	= Enabled 6.00	10 seconds to set DTC	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Body Control Module	U2203	This DTC monitors for a Central Gateway Module Lost Communication with Body Control Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Body Control Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module BCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Diesel Exhaust Fluid Control Module	U2204	This DTC monitors for a Central Gateway Module Lost Communication with Diesel Exhaust Fluid Control Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Diesel Exhaust Fluid Control Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module DEFC	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with HVAC Display - Front	U2209	This DTC monitors for a Central Gateway Module Lost Communication with HVAC Display - Front error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with HVAC Display - Front DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module HVAC Display - Front	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with HVAC Display - Rear	U220A	This DTC monitors for a Central Gateway Module Lost Communication with HVAC Display - Rear error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with HVAC Display - Rear DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module HVAC Display - Rear	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Shifter Interface Board Module	U220D	This DTC monitors for a Central Gateway Module Lost Communication with Shifter Interface Board Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Shifter Interface Board Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module SIB	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Transmission Control Module	U220F	This DTC monitors for a Central Gateway Module Lost Communication with Transmission Control Module error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Transmission Control Module DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module TCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Lost Communication with Body Control Module	U2215	Detects loss of communication from the BCM on CAN2 (PDU routed from GCM to SIB on CAN3).	CAN frames sent from the BCM (PDU routed through the CGM) are not detected	Begins to mature when message has not arrived in 2.5x nominal transmit rage.	CAN Communication DTC Type (0 = disabled)	= Enabled 6.00	10 seconds to set DTC	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Lost Communication with Engine Control Module on CAN Bus 2	U2405	Detects loss of communication from the ECM on CAN2 (PDU routed from GCM to SIB on CAN3).	CAN frames sent from the ECM (PDU routed through the CGM) are not detected	Begins to mature when message has not arrived in 2.5x nominal transmit rage.	CAN Communication DTC Type (0 = disabled)	= Enabled 6.00	10 seconds to set DTC	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module High Speed CAN Bus Off	U2413	This DTC monitors for a Central Gateway Module High Speed CAN Bus Off error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module High Speed CAN Bus Off DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module	 is being received is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1	U2418	This DTC monitors for a Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1 error as determined by theCGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 1 DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module BSCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2	U2419	This DTC monitors for a Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2 error as determined by theCGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Brake System Control Module on CAN Bus 2 DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module BSCM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2	U241C	This DTC monitors for a Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2 error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 2 DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module ECM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Central Gateway Module Lost Communication with Engine Control Module on CAN Bus3	U241D	This DTC monitors for a Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 3 error as determined by the CGM	A corresponding index within the CGM Diagnostic Status Message Signal indicates that the Central Gateway Module Lost Communication with Engine Control Module on CAN Bus 3 DTC has set in the CGM. See CGM summary pages for more information.		General Enable Criteria: The corresponding index within the CGM Diagnostic Status Message Signal Central Gateway Module ECM	 is being received is present on the bus is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transmission Control Module to Electronic Transmission Control Module on LIN BUS.	U250D	Detects if Range Command Echo from TCM matches current Range Command (For Internal ETRS only)	Check Range Command Echo vs Range Command when Range Command Poke is called	Range Command Echo ± Range Command	Diagnostic Enable Calibration Recent Range Command Transition TCM LIN Node or Bus Fault Active The enabling calibration must be set to 6 to enable a type B DTC:	= TRUE = FALSE = FALSE 6.00	80 failures out of 100 samples 50 ms loop	DTC Type B, Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Odometer Vehicle Identification Number Not Programmed	U2A90	This DTC checks that the odometer VIN is correctly written	At least one of the programmed odometer VIN digits	Not a valid ASCII value	KeVIND_b_Odo_VIN_NP _EnableDTC	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Odometer Vehicle Identification Number Invalid Configuration	U2A91	This DTC checks that the odometer VIN matches the ECU VIN	At least one of the programmed odometer VIN digits	Does not match the ECU VIN digits.	KeVIND_b_OdoVIN_EnableDTC	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge r VGT A Position Exceeded Learning Limit (Single and Two stage VGT DC Motor)	P003A	This monitor checks if the VGT position SENT sensor has an offset with respect to the nominal positions where the valve does the learning procedure (fully closed and/or fully open)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold OR SENT position raw voltage when the valve is in wide open position < low threshold OR SENT position raw voltage when the valve is in wide open position > high threshold	<72.00 [%5V] OR >89.00 [%5V] OR <14.00 [%5V] OR >32.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: - engine coolant temperature in range; - no faults present on coolant temperature sensor. - outside air temperature greater than a low threshold - no faults present on outside air temperature sensor. - battery voltage greater than a low threshold No faults present on VGT position sensor, VGT valve, VGTposition deviation. End Of Trip event has elapsed	==1.00 >=30.00 (°C) <=150.00 (°C) ECT_Sensor_FA ==FALSE >= -40.00 (°C) OAT_PtEstFiltFA >= 9.50 (V) VGT_PstnSnsrFA ==FALSE VGT_ActCktFA==FALSE VGT_PstnCntrlFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge rVGTA Control Circuit (Single and Two stage VGT DC Motor)	P0045	This monitor checks if the DC-Motor VGT commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge r VGT A Performance (Single and Two stage VGT DC Motor)	P0046	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening or closing) checking the setpoint position against the position measured by the VGT Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	>10.00 [%]	Test enabled by calibration	==1.00	960.00 fail counts out of 1,200.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation)	VGT_PstnSnsrFA ==FALSE VGT_ActCktFA==FALSE VGT_PstnCntrlFA ==FALSE		
					VGT position setpoint in steady state conditions for minimum time	>-125.00 [%/s] <125.00 [%/s] for >=0.50 [s]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>=0.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Outside air temperature higher or equal to minimum threshold	>=-60.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge r VGT A Control Circuit High (Single and Two stage VGT DC Motor)	P0048	This monitor checks if the DC-Motor VGT commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is ON			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger Boost Control "A" Supply Voltage Circuit Low	P006E	This monitor checks if the VGT DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Performance	P007B	This monitor checks if the CAC up air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler up air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	>20.00 [°C]	Test enabled by calibration	==1.00	Test executed after a counter of 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	<2.00 [s]		
					Runk Crank Relay voltage in range	>11.00 [V]		
					The engine has not run for a calibratable time since last key off	>=28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	<45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler up air temperature sensors	CIT_CAC_UpCktFA ==FALSE CIT_CAC_UpSelfCorFA ==FALSE		
					No faults detected on intake manifold air temperature sensor	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults detected on fuel temperature sensor	FTS_FTS_Flt==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Low	P007C	This monitor checks if the CAC up air temperature sensor is out of electrical range low	Charge air cooler up air temperature resistance value < low threshold	<55.00 [ohm]	Test enabled by calibration	==1.00	30.00 fail counter over 38.00 sample counter	Type B, 2 Trips
					Engine not cranking			
					Runk Crank Relay voltage in range	>11.00 [V]	Functional task: 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit High	P007D	This monitor checks if the CAC up air temperature sensor is out of electrical range high	Charge air cooler up air temperature resistance value > high threshold	>20,000,000.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 > 11.00 [V]	30.00 fail counter over 38.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Up Circuit Intermittent/ Erratic	P007E	This monitor checks if the CAC up air temperature has an intermittent fault	Charge air cooler up air temperature value > T_MAX_threshold OR Charge air cooler up air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading -T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	>300.00 [°C] <-60.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC up air temperature sensor	==1.00 >11.00 [V] CIT_CAC_UpCktFA ==FALSE	60.00 fail counter over 75.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Temperature Sensor "A" Circuit Range/ Performance	POODF	This monitor checks if the CAC inlet water temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	CAC inlet water temperature is compared at power up with an average temperature calculated using the CAC inlet gas temperature sensor and the CAC outlet gas temperature sensor over a calibratable number of samples. Temperature difference (absolute value)	> 20.00 [°C]	Test enabled by calibration Key on and engine not running or engine running for less than a calibratable time Engine not cranking Runk Crank Relay voltage in range The engine has not run for a calibratable time since last key off No faults detected on engine off timer Absolute value of the difference between CAC inlet gas temperature and CAC outlet gas temperature smaller than a calibratable threshold Sensor Performance Check not yet completed in current driving cycle	1.00==TRUE < 2.00 [s] ==TRUE >11.00 [V] >= 28,800.00 [s] EngineModeNotRunTimer Error ==FALSE < 45.00 [°C] ==TRUE	The averaged temperatures are calculated over 10.00 samples. No debounce is present: DTC sets as soon as the error is present Function task: at key on	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults detected on CAC inlet gas temperature sensor	CIT_CAC_UpFA ==FALSE		
					No faults detected on CAC outlet gas temperature sensor	CIT_CAC_DwnFA ==FALSE		
					No electrical or intermittent faults detected on CAC inlet water temperature sensor	CIW_TempInCktFA ==FALSE CIW_TempInSlfCorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Temperature Sensor "A" Circuit Low	P00E0	This monitor checks if the CAC inlet water temperature sensor is out of electrical range low	Temperature raw resistance < low threshold	<70.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	1.00 ==TRUE > 11.00 [V]	30.00 fail counts out of 38.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Temperature Sensor "A" Circuit High	P00E1	This monitor checks if the CAC inlet water temperature sensor is out of electrical range high	Temperature raw resistance > high threshold	> 166,297.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	1.00 ==TRUE > 11.00 [V]	30.00 fail counts out of 38.00 sample counts Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Coolant Temperature Sensor "A" Intermittent/ Erratic	P00E2	This monitor checks if the CAC inlet water temperature sensor has an intermittent fault.	CAC inlet water temperature value > T_MAX_threshold OR CAC inlet water temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading -T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 150.00 [°C] < -60.00 [°C]	Test enabled by calibration Engine not cranking Run Crank Relay voltage in range No electrical faults detected on CAC inlet water temperature sensor	1.00==TRUE ==TRUE > 11.00 [V] CIW_TempInCktFA ==FALSE	60.00 fail counter over 75.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Performance (OBDII only)	P0101	This monitor checks if the MAF sensor measure is coherent with MAF estimation when the HP EGR and LP EGR are closed. It is able to detect MAF sensor wiring harness poor contacts, MAF sensor internal fault (offset), leaks from the induction air circuit, leaks from the recirculation exhuast gas circuit. For OBDII market, it can be used to detect a PCV disconnection in case a dedicated pressure sensor is not present. The standard test can be calibrated to run when engine conditions are recognised as IDLE, OVERRUN or HIGH LOAD. An intrusive test can be enabled in idle, to force the HP EGR and the LP EGR to close when particular conditions are encountered, to allow the monitoring to run. An intrusive test can be enabled in overrun, to force the HP EGR and the LP EGR to close and the throttle valve to open when particular	Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflRaw ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	>1.25 [ratio] <0.75 [ratio]	Calibration on diagnostic enabling PT relay supply voltage in range MAF sensor is not depowered Estimated mass air flow is valid No Electrical or offset fault present on MAF sensor Outside Ambient Temperature in range OR Fault present on Ouside Air temperature Induction air temperature No fault present on induction air temperature sensor	1.00==TRUE >11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVid ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE >=-20.00 [°C] OR OAT_PtEstFiltFA==TRUE >-20.00 [°C] IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE >40.00 [°C]	Test is evaluated after the enabling conditions are satisfied for a number of samples ==500.00 Sampling time is: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		conditions are encountered, to allow the monitoring to run in case the Diesel Exhaust Cooling Prevention (DECP) strategy is requiring EGR usage and/or throttle control during cut-off maneuvers.			(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature No faults detected on engine coolant temperature sensor Barometric pressure No faults detected on barometric pressure sensor Throttle valve position No faults detected on Throttle valve position sensor HP EGR valve position No faults detected on HP EGR valve position sensor	==TRUE <130.00 [°C] ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE > 69.50 [kPa] AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTK 0 ==FALSE > 85.00 [%] TPS_PstnSnsrFA ==FALSE <= 1.00 [%] EGR_PstnSnsrFA ==FALSE <= 1.00 [%]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					LP EGR valve position No faults detected on LP EGR valve position sensor Engine works in IDLE, OVERRUN or HIGH LOAD conditions	LPE_PstnSnsrFA ==FALSE Refer to "Engine conditions" Free Form		
			Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_Arf1Raw ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	> 1.25 [ratio] <0.75 [ratio]	Intrusive Test in idle enabled by calibration MAF rationality monitoring enabled by calibration Diagnostic has not run in current driving cycle yet SCR predicted NOx conversion efficiency Air control is working only in EGR control: Desired EGR rate Vehicle speed No faults detected on vehicle speed sensor	0.00==TRUE 1.00==TRUE ==TRUE > 0.60 [ratio] = 100% < 3.00 [kph] VehicleSpeedSensor_FA ==FALSE Enabled if < 10.00 [mm^3]	Test is evaluated after the enabling conditions are satisfied for a number of samples ==500.00 Sampling time is: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Desired fuel in range, with hysteresis	AND > 4.00 [mm^3] Disabled if > 12.00 [mm^3] OR < 2.00 [mm^3] OR ==TRUE		
					OR Global OBD flag for fuel quantity at idle in range			
					PT relay supply voltage in range	>11.00 [V]		
					MAF sensor is not depowered	==TRUE		
					Estimated mass air flow is valid	MAF_AirFlowEstdSS_NotVid ==FALSE		
					No Electrical or offset fault present on MAF sensor	MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE		
					Outside Ambient Temperature in range OR Fault present on Ouside Air temperature	>-20.00 [°C] OR OAT_PtEstFiltFA==TRUE		
					Induction air temperature	>-20.00 [°C] IAT_SensorFA ==FALSE IAT_SensorTFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No fault present on induction air temperature sensor	==FALSE		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	>40.00 [°C] ==TRUE <130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Throttle valve position	> 85.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					Engine speed in range OR	> 1,000.00 [rpm] < 660.00 [rpm] OR ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Global OBD flag for idle speed in range			
					for a time	>= 1.00 [s]		
					Intake manifold pressure in range	> 69.60 [kPa] < 130.00 [kPa]		
					Intake manifold pressure is in steady state (SS)	when SS is OFF, the first value of Intake manifold pressure is taken as reference (p_ref); then, | Intake manifold pressure - p_ref| < 5.00 [kPa] for maintaining the SS ON		
					Time elapsed after previous intrusive test request has aborted	> 1.00 [s]		
					Once all the conditions above are satisfied, additional conditions on HP EGR and LP EGR valves must be verified within a time limit:	< 0.50 [s]		
					HP EGR valve position	<= 1.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<= 1.00 [%]		
					No faults detected on LP EGR valve position sensor	LPE_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					All conditions are verified for a time	> 2.00 [s]		
			Drift high check: drift of the mass air flow Drift low check: drift of the mass air flow The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass air flow. The ratio is averaged over a calibrate-able cumulative transient time. If, by calibration, CeMAFD_e_ArflRaw ==CeMAFD_e_ArflRaw, the MAF sensor reading is given by the raw MAF value multiplied by the **P0101: Pulsation Map**	> 1.25 [ratio] <0.75 [ratio]	Intrusive Test in overrun enabled by calibration MAF rationality monitoring enabled by calibration Diagnostic has not run in current driving cycle yet PT relay supply voltage in range MAF sensor is not depowered Estimated mass air flow is valid No Electrical or offset fault present on MAF sensor Outside Ambient Temperature in range OR	0.00 ==TRUE 1.00==TRUE ==TRUE > 11.00 [V] ==TRUE MAF_AirFlowEstdSS_NotVid ==FALSE MAF_MAF_SnsrCktOffstFA ==FALSE MAF_MAF_SnsrCktOffstTFKO ==FALSE >-20.00 [°C] OR OAT_PtEstFiltFA==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples ==500.00 Sampling time is: 12.5 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault presenton Ouside Air temperature	>-20.00 [°C]		
					Induction air temperature	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==FALSE		
					No fault present on induction air temperature sensor	>40.00 [°C]		
					(Engine Coolant Temperature OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature	==TRUE <130.00 [°C]		
					No faults detected on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE ECT_Sensor_TFTKO ==FALSE		
					Barometric pressure	> 69.50 [kPa]		
					No faults detected on barometric pressure sensor	AAP_AmbientAirPresDfltd ==FALSE AAP_AmbPresSnsrTFTKO ==FALSE		
					Time elapsed after previous intrusive test request has aborted	> 1.00 [s]		
						Refer to "Engine		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						conditions" Free Form		
					Engine works in OVERRUN conditions, except for the conditions on Intake manifold pressure in range and in steady state (SS)			
					Intake manifold pressure greater than a threshold	> **P0101: Manifold pressure Low limit in (Overrun -** 0.00) [kPa]		
					Intake manifold pressure lower than a threshold, with hysteresis	TRUE if: < **P0101: Manifold pressure High limit in (Overrun -** 0.00) [kPa]; FALSE if: > **P0101: Manifold pressure High limit in Overrun** [kPa]		
					Once all the conditions above are satisfied, additional conditions on HP EGR, LP EGR and throttle must be verified within a time limit:	< 0.50 [s] <= 1.00 [%]		
					HP EGR valve position	EGR_PstnSnsrFA ==FALSE		
					No faults detected on HP EGR valve position sensor	<= 1.00 [%]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					LP EGR valve position	LPE_PstnSnsrFA ==FALSE		
					No faults detected on LP EGR valve position sensor			
						>85.00 [%]		
					Throttle valve position	TPS_PstnSnsrFA ==FALSE		
					No faults detected on Throttle valve position sensor			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Circuit Low	P0102	This monitor checks if the MAF sensor is out of electrical range low. The MAF sensor is out of electrical range low in case of sensor internal fault or wiring harness faults.	MAF frequency value	<1,150.00 [Hz]	Test enabled by calibration	1.00==TRUE	30.00 fail counts out of 38.00 sample counts Function task: 100 ms	Type A, 1 Trips
					PT relay supply voltage in range	> 11.00 [V]		
					Share High Side Driver closed	==TRUE		
					All conditions are valid for a time	>= 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow (MAF) Sensor Circuit High	P0103	This monitor checks if the MAF sensor is out of electrical range high. The MAF sensor is out of electrical range high in case of sensor internal fault or wiring harness faults.	MAF frequency value	>5,250.00 [Hz]	Test enabled by calibration PT relay supply voltage in range Share High Side Driver closed All conditions are valid for a time	1.00==TRUE > 11.00 [V] ==TRUE >= 1.00 [s]	30.00 fail counts out of 38.00 sample counts Function task:100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Trim System Lean Bank 1	P0171	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its minimum value.	Released FSA fuel correction value	< refer to supporting table (**KtFADC_V_FSA_Fuel Min**) [mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00[V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.00 [s] > 70.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Trim System Rich Bank 1	P0172	This DTC monitors if FSA control system has reached its maximum authority and cannot achieve the target. An error shall be detected when the fuel adjustment value (mm3) released by FSA is saturatedat its maximum value.	Released FSA fuel correction value	> refer to supporting table (**KtFADC_V_FSA_Fuel Max**)[mm3]	System voltage in range FSA correction release enabled (FSA Learning is active OR DFSA Learning is active) for a time Ambient air pressure OBD Coolant Enable Criteria OR Engine coolant temperature Ambient air temperature No Low fuel tank level indication No pending or confirmed DTCs	> 11.00[V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR FAD_DFSA_EnblLrn) > 1.00 [s] > 70.00 [kPa] = TRUE > 45.00 [°C] > -20.00 [°C] LowFuelConditionDiagnostic AmbPresDfltdStatus (ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing Perfomance - Over Retarded	P01CB	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 1. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] >120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 1 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 1 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing Perfomance - Over Advanced	P01CC	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 1. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 1. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 1 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lower than a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 1 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing Perfomance - Over Retarded	P01CD	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 2. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] >120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 2 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 2 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing Perfomance - Over Advanced	P01CE	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 2. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 2. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated with VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 2 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 2 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing Perfomance - Over Retarded	P01CF	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 3. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] >120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 3 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 3 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing Perfomance - Over Advanced	P01D0	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 3. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 3. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 3 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 3 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing Perfomance - Over Retarded	P01D1	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 4. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] >120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 4 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 4 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing Perfomance - Over Advanced	P01D2	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 4. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 4. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 4 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 4 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing Perfomance - Over Retarded	P01D3	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 5. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] >120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 5 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 5 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing Perfomance - Over Advanced	P01D4	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 5. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 5. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 5 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 5 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing Perfomance - Over Retarded	P01D5	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 6. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] >120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 6 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 6 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing Perfomance - Over Advanced	P01D6	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 6. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 6. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 6 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 6 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injection Timing Perfomance - Over Retarded	P01D7	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 7. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] >120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 7 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 7 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injection Timing Perfomance - Over Advanced	P01D8	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 7. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 7. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 7 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 7 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injection Timing Perfomance - Over Retarded	P01D9	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and timing affecting injector 8. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] >120.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 8 Injection Timing Perfomance - Over Advanced not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is higher than a calibrate-able threshold a DTC is set. If an excessive negative drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive positive drift is disabled (Cylinder 8 Injection Timing Performance - Over Advanced is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injection Timing Perfomance - Over Advanced	P01DA	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and timing affecting injector 8. During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the angular acceleration produced during the combustion phase. By comparing the angular acceleration value produced during the combustion phase with the angular acceleration that would be produced during the combustion of a nominal fuel quantity (e.g. 1,5mm3), the SQA is able to calculate the drift, in term of energizing time, on injector 8. Several injections, with different injection quantities, are performed in order to define the correct DeltaET to reach the target crank wheel angular acceleration and obtain the injector behavior in the small	Suspicious confidence level of tested injector (To fail suspicious), function of Current Energizing time calculated with SSQA and delta Energizing time calculated in the previous test: **KtFADD_Pct_SSQA_InjSuspConfLvl** (Delta Enegizing Time, Delta Energizing Time old) In case the first test fails: Delta Energizing time calculated by VSQA (To fail Validation)	< 50.00 [%] < -105.00 [us]	SQA Diagnosis enabled SSQA and VSQA enabled via calibration Baro Pressure Ambient temp No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE XSQA Learning conditions enabled Power Take Off status NAND Boolean Flag used to disable SQA in case of power take off active Cylinder 8 Injection Timing Perfomance - Over Retarded not set	1.00 1.00 >=70.00 [kPa] >=-9.00 [°C] LowFuelConditionDiagnostic 1.00 FAD_XSQA_LrnCondEnbl = 0.00	Inj_To_PassFail_SSQA Number of injections in case sospicious pass or (if sospicious fails) Inj_To_PassFail_SSQA +Inj_To_PassFail_VSQA number of injections to pass or fail validation. Once per Trip if suspicious and validations (in case of sospicious injectors detected) have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		quantity area. This energizing time is then used for the diagnostic test that is performed in two different steps: The first is the suspicious (SSQA) in which all the injectors are classified as suspicious or not suspicious. During this phase several injections are performed on all the injectors in order to calculate the drift, in term of energizing time, of each injector. The drift found is then used together with the drift found in the previous test to enter a calibrate-able map in which a confidence level between 0 and 100% is given to each injector. The confidence levels depends on the delta energizing time between two consecutive tests. An injector is considered suspicious if the confidence level is lower than a calibrate-able threshold. The suspicious phase can only report test pass for not suspicious injectors while the injectors that fail the						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		suspicious are tested by means of VSQA (Validation Small Quantity Adjustment) in order to validate or not the fault. The validation starts from the most suspicious injector (using the distance of current DeltaET from the VSQA calibrate-able thresholds) found during Suspicious phase and performs a calibrate-able number of injections, generally higher than the number of injection performed during suspicious, in order to find out a more accurate drift value for the tested injector. If the Delta Energizing time calculated during this phase is lowerthan a calibrate-able threshold a DTC is set. If an excessive positive drift is detected (this diagnosis failed), the diagnosis on the same cylinder of a possible excessive negative drift is disabled (Cylinder 8 Injection Timing Perfomance - Over Retarded is disabled) and viceversa.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Open Circuit	P0201	This DTC checks the Injector 1 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Open Circuit	P0202	This DTC checks the Injector 2 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 3 Open Circuit	P0203	This DTC checks the Injector 3 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Open Circuit	P0204	This DTC checks the Injector 4 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 5 Open Circuit	P0205	This DTC checks the Injector 5 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Open Circuit	P0206	This DTC checks the Injector 6 circuit for electrical integrity during operation.	Low current through the low side driver during operation indicates open circuit	Open circuit: circuit attached to the Controller external connections has an impedance >= 200 K Ohm	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injection Timing	P020A	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 1 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 1 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderA or (Active DTC: and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderA FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderA ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injection Timing	P020B	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 2 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 2 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderB or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderB FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderB ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injection Timing	P020C	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 3 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 3 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderC FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderC ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injection Timing	P020D	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 4 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 4 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderD FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO ==TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderD 1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injection Timing	P020E	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 5 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 5 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderE or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderE FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO ==TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderE ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injection Timing	P020F	This DTC detects an Injector fault or ECU fault that causes pull In period of the current pulse out of range on injector 6 The pull in period is the time for the injection current to rise to the current level (20.00 [A]) at the beginning of the pulse	Measurement of the Pull In period of the current pulse of the injector 6 provided by HWIO	< 50.00 [us] OR > 90.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one injection pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderF or (Active DTC and Strategy to reactivate the injector enabled and the injector has been commanded on for a time) and No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderF FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO == TRUE); FUL_PullInCylErrFlt_CiEPSR_CylinderF ==1.00 >0.1 us -	10 failures out of 20 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Injection Timing Control Circuit	P0216	This DTC detects an ECU internal fault, by comparing the cumulative injection pulse width provided by HWIO and the cumulative injection pulse width calculated by Application SW.
		A calibration is used to define the pulses that have to be taken into account to calculate the cumulative injection pulse width, both by HWIO and by application SW.
		Two different thresholds are defined for detecting the fault. The high threshold depends on the number of injection pulses active, i.e. the injection pulses driven and monitored.
			The cumulative injection pulse width (both HWIO and Application SW) is calculated by considering only the pulses to be monitored, defined in the calibration **P0216_ET_CumulEnbl**
			
			if (Cumulative injection pulse width read by HWIO > Cumulative injection pulse width calculated by Application SW)
			{
			|Cumulative injection pulse width read by HWIO-
			Cumulative injection pulse width calculated by Application SW|
			}
			else
			{
			|Cumulative injection pulse width read by HWIO-
			Cumulative injection pulse width calculated by Application SW|
			}
			
			OR
			information of dropped pulse reported by HWIO
			
			Cumulative injection pulse width calculated by
				>
				P0216_PulsWidthErrHi
				[us] depending on the number of injection pulses active
				
				> 40.00 [us]
					Test enabled by calibration;
					
					and
					Battery voltage
					
					and
					Key ON
					
					and
					No active DTC's:
					
					and
					No active DTC for the upcoming cylinder in compression:
					
					and
					At least one Injection
						== 1.00 [Boolean]
						
						> 11.00 [V]
						
						-
						
						FUL_CntrlrStTFTKO
						FUL_BoostVoltTFTKO
						
						FUL_CylInjCktFlt_CiEPSR_CylinderA
						FUL_CylInjCktFlt_CiEPSR_CylinderB
						FUL_CylInjCktFlt_CiEPSR_CylinderC
						FUL_CylInjCktFlt_CiEPSR_CylinderD
						FUL_CylInjCktFlt_CiEPSR_CylinderE
						FUL_CylInjCktFlt_CiEPSR_CylinderF
						FUL_PullInCylErrFlt_CiEPSR_CylinderA
						FUL_PullInCylErrFlt_CiEPSR_CylinderB
						FUL_PullInCylErrFlt_CiEPSR_CylinderC
						FUL_PullInCylErrFlt_CiEPSR_CylinderD
						FUL_PullInCylErrFlt_CiEPSR_CylinderE
						FUL_PullInCylErrFlt_CiEPSR_CylinderF
							21 failures out of 252 samples
							
							or
							
							53 consecutive failures
							
							1 sample every cylinder firing
							
							Continuous
								Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Application SW is equal to the sum of the programmed pulses width and the end of injection period measurement provided by HWIO.		Pulse is requested by the application software (FUL_FuelInjected and	== TRUE);		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Control Circuit Low Voltage	P0261	This DTC detects a short circuit to ground of the low side driver circuit of Injector 1.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Control Circuit High Voltage	P0262	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 1.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Control Circuit Low Voltage	P0264	This DTC detects a short circuit to ground of the low side driver circuit of Injector 2.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Control Circuit High Voltage	P0265	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 2.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 3 Control Circuit Low Voltage	P0267	This DTC detects a short circuit to ground of the low side driver circuit of Injector 3.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 3 Control Circuit High Voltage	P0268	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 3.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration;	== 1 [Boolean]	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips
					and Battery voltage	> 11.00 [V]		
					and Key ON	-		
					and Engine is not cranking	-		
					and Engine Running	>= 1.00 [s]		
					and FUL_OutEnblCyl_CiEPSR_CylinderH	== 0 [Boolean]		
					and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	==TRUE);		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Efficiency Below Threshold (OBDII market only)	P026A	This monitor checks the Charge Air Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels. It applies to both air-cooled and water-cooled Charge Air Coolers (WCAC), depending on application. The reference temperature can be selected to account for different architectures or applications, in order to guarantee a robust WPA/BPU separation in all conditions. The selectable temperature sensors used as reference are: Outside Air Temperature, Induction Air Temperature, WCAC inlet coolant temperature.	Charge Air Cooler Efficiency (averaged over a calibrate-able cumulative transient time) is compared with a threshold. Charge Air Cooler Efficiency is computed as the ratio between (CAC upstream temperature - CAC downstream temperature) and (CAC upstream temperature - Reference temperature). Reference temperature can be selected via calibration CeCIDG_e_WCAC_WaterTempIn : - if equal to CeCIDG_e_InductTemp, it is the induction air temperature; - if equal to CeCIDG_e_OutsideTemp, it is the outside air temperature; - if equal to CeCIDG_e_WCAC_WaterTempln, it is the water temperature at the WCAC inlet. Each sample of the computed Charge Air Cooler Efficiency (before	<42.00 [%] **P026A: Efficiency Offset [%]**	Calibration on diagnostic enabling Diagnostic has not run in current driving cycle yet Vehicle speed in range Compressor flow (Air + LP EGR) in range Engine coolant temperature in range OR OBD Coolant Enable Criteria Throttle valve position Pressure ratio through the compressor in range Temperature difference between upstream charge air cooler temperature and Reference temperature in range Water pump speed in range Environmental pressure in	1.00==TRUE ==TRUE >30.00 [kph] > 40.00 [mg/s] < 200.00 [mg/s] >60.00 [°C] ==TRUE >85.00 [%] > 1.25 [ratio] > 50.00 [°C] > 1,400.00 [rpm] >69.60 [kPa]	Test executed after 160.00 samples are collected and their average is computed Function task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			the average) is corrected by an offset depending on the compressor flow and the water pump speed.		range			
					Environmental temperature in range	>-9.00 [°C]		
					No fault on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on throttle position sensor	TPS_PstnSnsrFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on ambient temperature sensor	OAT_PtEstFiltFA ==FALSE		
					No fault on Reference temperature sensor	OAT_PtEstFiltFA ==FALSE OR IAT_SensorFA==FALSE OR CIW_TempInFA==FALSE		
					No fault on charge air cooler upstream and downstream temperature sensors	CIT_CAC_UpFA==FALSE CIT_CAC_DwnFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Compressor flow estimation is valid	INM_ComprTotFlowNotVld ==FALSE		
					No fault on Intake Manifold Pressure sensor	MAP_SensorFA==FALSE		
					No fault on Water pump speed sensor	ICPR_b_IC_PmpPerfFA ==FALSE, OR ICPR_b_IC_PmpCktFA ==FALSE, OR ICP_CWP_LcFA ==FALSE, OR ICP_CWP_Rsp_FoFA ==FALSE		
					All the enabling conditions last for a time	>=4.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injection Timing Performance	P026B	This DTC detects an injection timing only fault by comparison of the requested Start of Injection by Application SW and the scheduled SOI by HWIO SW.	Comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SWfor all cylinders.	< -5.00 OR >5.00	Test enabled by calibration AND Engine Speed in range AND At least one injection pulse is commanded by Application SW on all cylinders in the previous engine cycle FUL_FuelInjectedCyl_CiEPSR_CylinderA FUL_FuelInjectedCyl_CiEPSR_CylinderB FUL_FuelInjectedCyl_CiEPSR_CylinderC FUL_FuelInjectedCyl_CiEPSR_CylinderD FUL_FuelInjectedCyl_CiEPSR_CylinderE FUL_FuelInjectedCyl_CiEPSR_CylinderF FUL_FuelInjectedCyl_CiEPSR_CylinderG FUL_FuelInjectedCyl_CiEPSR_CylinderH AND At least one injection pulse is commanded by HWIO OR at least one post injection is commanded by Application SW, on all cylinders in the previous engine cycle	== 1.00 > 400 [rpm] AND < 3,000.00 ==TRUE; -	280.00 failures out of 400.00 samples 1 sample every engine revolution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No information of dropped pulse reported by HWIO			
					AND No electrical fault on injectors are present	FUL_FuelInjCkt_FA		
					AND No Injection Controller Fault	FUL_CntrlStFA		
					AND No faults on crankshaft sensor for the entire driving cycle.	CrankSensor_FA AND CrankSensor_TFTKO		
					AND Cold Start Strategy not enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injection Quantity Lower Than Expected	P026C	An error shall be detected when the fuel adjustment value (mm3) released by FSA is below a calibrated threshold.	Released FSA fuel correction value lower than a threshold A selected based on active combustion mode (refer to supporting table **KaFADR_e_FSA_ECM_CombModeGrp)** multiplied per ambient air pressure correction factor B	<A*B A = (IfGroupI is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp1** If Group2 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp2** If Group3 is selected: refer to supporting table **KtFADD_V_FSA_ECM_LoThrshGrp3**) [mm^3] B = (refer to supporting table **KtFADDKFSAECMPresAmbWghtLo)**	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. (Power Take-Off (PTO) is not active OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.00 + 1.00 [s] > 11.00[V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtnValid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean])) > 1.00 [s] > 70.00 [kPa] 0 [boolean] = TRUE > 45.00 [°C] > -20.00 [°C] different from Neutral or Parking	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for a time (only in case of Automatic Transmission)	> 0.50 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,800 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 15 [mm^3] < 50 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^3/25ms] > 2.00 [s]		
					m. Vehicle speed in operating range for a time	> 30 [kph] < 140 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_ (CombModeGrp)**		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq OXY_eqr TurbDwn FSA _NotVld		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injection Quantity Higher Than Expected	P026D	An error shall be detected when the fuel adjustment value (mm^3) released by FSA is above a calibrated threshold.	Released FSA fuel correction value higher than a threshold A selected based on active combustion mode (refer to supporting table **KaFADR_e_FSA_ECM_CombModeGrp)** multiplied per ambient air pressure correction factor B	> A*B A = (If GroupI is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrpI** If Group2 is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrp2** If Group3 is selected: refer to supporting table **KtFADD_V_FSA_ECM_HiThrshGrp3**) [mm^3] B = (refer to supporting table **KtFADD_K_FSA_ECMPresAmbWghtHi)**	Following conditions are met for a calibrated time: a. System voltage in range b. FSA correction release enabled c. (FSA Learning is active OR (DFSA Learning is active AND Boolean Flag used to enable DFSA learningactive check is TRUE)) for a time d. Ambient air pressure e. (Power Take-Off (PTO) is not active OR Boolean flag used to disable FSA in case of PTO active is FALSE) f. (OBD Coolant Enable Criteria OR Engine coolant temperature) g. Ambient air temperature h. Gear engaged	> 0.00 + 1.00 [s] > 11.00[V] refer to "FSA Control Flag" Free Form FAD_FSA_NormRngCrtn Valid refer to "FSA Control Flag" Free Form (FAD_FSA_EnblLrn OR (FAD_DFSA_EnblLrn AND 1 [boolean])) > 1.00 [s] > 70.00 [kPa] 0 [boolean] = TRUE > 45.00 [°C] > -20.00 [°C] different from Neutral or	Time counter: 200 failures out of 400 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Parking		
					for a time (only in case of Automatic Transmission)	> 0.50 [s]		
					i. Engine speed in operating range	> 1,100 [rpm] < 1,800 [rpm]		
					j. Engine speed gradient for a time	< 85 [rpm/25ms] > 0.50 [s]		
					k. Injected fuel quantity in operating range	> 15 [mm^3] < 50 [mm^3]		
					l. Injected fuel quantity gradient for a time	< 1.00 [mm^3/25ms] > 2.00 [s]		
					m. Vehicle speed in operating range for a time	> 30 [kph] < 140 [kph] > 0.50 [s]		
					n. Difference between FSA estimated error and FSA correction quantity	< 1,000.00 [mm^3]		
					o. Active combustion mode in selected group	refer to supporting table **KaFADR_e_FSA_ECM_ (CombModeGrp)**		
					p. No Low fuel tank level indication	LowFuelConditionDiagnostic		
					q. No pending or confirmed DTCs	(ECT_Sensor_TFTKO AND ECT_Sensor_FA) OAT_PtEstFiltFA FAD_FSA_LrnShtOffReq		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OXY_eqr_TurbDwn_FSA _NotVld		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Control Circuit Low Voltage	P0270	This DTC detects a short circuit to ground of the low side driver circuit of Injector 4.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Control Circuit High Voltage	P0271	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 4.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 5 Control Circuit Low Voltage	P0273	This DTC detects a short circuit to ground of the low side driver circuit of Injector 5.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 5 Control Circuit High Voltage	P0274	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 5.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Control Circuit Low Voltage	P0276	This DTC detects a short circuit to ground of the low side driver circuit of Injector 6.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: impedence between LS pin and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Control Circuit High Voltage	P0277	This DTC detects a short circuit to power supply of the low side driver circuit of Injector 6.	Voltage high across low side driver during On state indicates short to power	Short to power: impedence between LS pin and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Fuel Injector Offset Learning At Min Limit	P02CC	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. 1 Sample every cylinder firing event.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Fuel Injector Offset Learning At Max Limit	P02CD	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 1. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Fuel Injector Offset Learning At Min Limit	P02CE	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Fuel Injector Offset Learning At Max Limit	P02CF	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 2. The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Fuel Injector Offset Learning At Min Limit	P02D0	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 3. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Fuel Injector Offset Learning At Max Limit	P02D1	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 3 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Fuel Injector Offset Learning At Min Limit	P02D2	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Fuel Injector Offset Learning At Max Limit	P02D3	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 4 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Fuel Injector Offset Learning At Min Limit	P02D4	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 5. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Fuel Injector Offset Learning At Max Limit	P02D5	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 5 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Fuel Injector Offset Learning At Min Limit	P02D6	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 6. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Fuel Injector Offset Learning At Max Limit	P02D7	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 6 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Fuel Injector Offset Learning At Min Limit	P02D8	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 7. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Fuel Injector Offset Learning At Max Limit	P02D9	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 7 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Fuel Injector Offset Learning At Min Limit	P02DA	This diagnosis (Min Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 8. The result of this test is then stored in a boolean NV array cointaing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	< **KaFADC_t_SQA_MinAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is lower than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Minimum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for minimum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Fuel Injector Offset Learning At Max Limit	P02DB	This diagnosis (Max Authority monitoring) performs a check on the absolute Energizing Time learnt by SQA (Small Quantity Adjustment). During Diesel Fuel Cut-off conditions SQA command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks, by means of crank-wheel sensor, the torque produced during the combustion phase. Two different learning strategies are used: Target SQA (TSQA): This strategy is a closed loop between fuel quantity injected and torque produced during combustion phase. The fuel quantity injected is increased/decreased until the angular acceleration target is reached. The Delta Energizing Time needed to achieve the target is then stored in SQA Map. Extrapolated SQA (ESQA): With this strategy several injections with different injection quantities are performed and, for	Each time a new value is entered in SQA map the diagnosis checks if: - DeltaET learnt by (x) SQA on cylinder 8 The result of this test is then stored in a boolean NV array cointaing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE.	> **KaFADC_t_SQA_MaxAdptDeltET[us]**	SQA Diagnosis enabled (x)SQA injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with (x) SQA. [Sample Rate: 1 Sample every cylinder firing event].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		each quantity, a delta ET is calculated using the difference between the torque produced during the combustion phase and the torque that would be produced during the combustion of a nominal fuel quantity. The results are then extrapolated in order to find the behaviour in all small quantity area. Each time a new value is entered in SQA map, regardless the strategies used to perform the learning (TSQA, ESQA, …), the diagnosis checks if the DeltaET learned by SQA is higher than a calibrateable threshold. The result of this test is then stored in a boolean NV array containing the status of Maximum authority test (TRUE=Saturated, FALSE= Not saturated) for all the rail pressure levels defined for SQA. The DTC for maximum authority reached is set if, at least one element of the array is equal to TRUE and is unset when all the elements of the array are equal to FALSE (no saturated values stored in SQA						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		map).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit	P02E0	This monitor checks if the Throttle commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	>200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Performance	P02E1	This monitor detects an obstruction on the actuator (obstruction found during the Throttle valve opening or closing) checking the setpoint position against the position measured by the Throttle Position Sensor	[Throttle Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 10.00 [%]	Test enabled by calibration	==1.00	960.00 fail counts out of 1,200.00 sample counts 480.00 fail counts to enable the open circuit check (P02E0) Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>=30.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-20.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					Throttle position closed loop control active (no faults present on Throttle position sensor, Throttle valve, Throttle position control deviation)	TPS_PstnSnsrCktFlt== FALSETPS_ActrFA == FALSETPS_PstnDvtnFA == FALSE		
					Throttle position setpoint in steady state conditions for minimum time	>-100.00 [%/s] <100.00 [%/s] for >= 0.30 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No mechanical stop soft approach in progress No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit High	P02E3	This monitor checks if the Throttle commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Stuck Closed	P02E5	This monitor detects the Throttle valve mechanically stuck in a certain position different from its defaulted position (fully open) when the actuator is no longer driven (missing dafaulted position)	Measured Throttle position < minimum threshold	<75.00 [%]	P02E1 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation	 >2.00 [s] TPS_PstnSnsrFA== FALSE TPS_ActrFA == FALSE TPS_PstnDvtnFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Circuit Low (SENT position sensor)	P02E8	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT communication	==1.00 >11.00 [V] TPS_SENT_LossCommFlt == FALSE	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Circuit High (SENT position sensor)	P02E9	This monitor checks if the Throttle SENT position sensor is out of electrical range low	SENT position raw voltage > high threshold	> 99.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle SENT communication	==1.00 >11.00 [V] TPS_SENT_LossCommFlt == FALSE	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Current Range/ Performance	P02EB	This monitor checks if an excessive current flows through the Throttle DC-Motor (e.g. shunt circuit between load, Throttle DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 5.5 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Throttle DC Motor current range/performance H-Bridge driver is ON HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V] TPS_MtrCurrLimTFTKO == FALSE	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injector Circuit Range/ Performance	P02EE	This DTC detects an Injector fault or ECU fault that causes injector 1 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 1 provided by HWIO	> 24.00 [us] OR < 7.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderA No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderA FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInCylErrFlt_CiEPSR_CylinderA ==TRUE) -	41 failures out of 82 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injector Circuit Range/ Performance	P02EF	This DTC detects an Injector fault or ECU fault that causes injector 2 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 2 provided by HWIO	> 24.00 [us] OR < 7.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderB No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderB FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInCylErrFlt_CiEPSR_CylinderB ==TRUE) -	41 failures out of 82 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injector Circuit Range/ Performance	P02F0	This DTC detects an Injector fault or ECU fault that causes injector 3 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 3 provided by HWIO	> 24.00 [us] OR < 7.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderC No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderC FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInCylErrFlt_CiEPSR_CylinderC ==TRUE) -	41 failures out of 82 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injector Circuit Range/ Performance	P02F1	This DTC detects an Injector fault or ECU fault that causes injector 4 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 4 provided by HWIO	> 24.00 [us] OR < 7.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderD No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderD FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInCylErrFlt_CiEPSR_CylinderD ==TRUE) -	41 failures out of 82 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injector Circuit Range/ Performance	P02F2	This DTC detects an Injector fault or ECU fault that causes injector 5 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 5 provided by HWIO	> 24.00 [us] OR < 7.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderE No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderE FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInCylErrFlt_CiEPSR_CylinderE ==TRUE) -	41 failures out of 82 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injector Circuit Range/ Performance	P02F3	This DTC detects an Injector fault or ECU fault that causes injector 6 End Of Injection period out of range The End Of Injection period is the time for the current in the injector to fall from the Hold or Bypass current to zero Ampere	Measurement of the Fall period of the current pulse of the injector 6 provided by HWIO	> 24.00 [us] OR < 7.00 [us]	Test enabled by calibration; and Battery voltage and Key ON and No active DTC's: and At least one Injection Pulse is requested by the application software; (FUL_FuelInjectedCyl_CiEPSR_CylinderF No information of dropped pulse reported by HWIO	== 1 [Boolean] > 11.00 [V] - FUL_CylInjCktFlt_CiEPSR_CylinderF FUL_CntrlrStTFTKO FUL_BoostVoltTFTKO FUL_PullInCylErrFlt_CiEPSR_CylinderF ==TRUE) -	41 failures out of 82 samples 1 sample every engine cycle Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug/ Heater Indicator Control Circuit Low	P037A	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to ground.	Test performed by HWIO. A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance R to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. The short to ground faults are not required to be detected when the Off state diagnostic leakage current source is Disabled.	R = 0.5 Q	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True >11.00 V == False	10.00 failures out of 15.00 samples (*) (*) Ground short monitoring is implemented in HWIO which means no further debouncing is needed in case of short to ground	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug/ Heater Indicator Control Circuit High	P037B	This DTC checks the wait to start lamp circuit for electrical integrity during operation. Wait to start lamp pin shorted to high voltage.	Test performed by HWIO. A power short condition shall be detected if the circuit attached to the Controller external connection has an impedance R to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R = 0.5 Q	Glow Lamp present Test enabled Run/Crank On Run/Crank voltage Engine cranking	== 1.00 [boolean] == 1.00 [boolean] == True >11.00 V == False	5.00 failures out of 10.00 samples Sampling rate: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug Sense Circuit Low	P037E	This DTC checks the circuit for electrical integrity during operation of glow plug sub-system. ECU internal fault.	Voltage feedback above threshold depending on system current and RunCrank relay voltage	battery_voltage - voltage_feedback > **KtGLOD_U_VoltLoDelMax (KnGLOD_1 GP_Curr**) [V]	Test enabled by calibration;	1.00 [boolean]	60.00 fail samples over 120.00 samples Time task: 50 [ms]	Type B, 2 Trips
					Key on and engine running (cranking excluded);	VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE;		
					Battery voltage in range;	VeLVTR_b_RunCranklgnlnRange = TRUE;		
					Enable_ON interface is true;	VeGLOO_b_GlowPlugEnbl = TRUE;		
					No electrical fault detected on glow plugs;	VeGLOO_b_ElectFlt = FALSE;		
					No faults detected on glow plug system supply;	GLO_GlowPlugSplyVoltCktTFTKO		
					Diagnostic system is not disabled;	VeDRERJDiagSystemDsbl = FALSE;		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug Sense Circuit High	P037F	This DTC checks the circuit for electrical integrity during operation of glow plug sub-system. ECU internal fault.	Voltage feedback over a threshold depending on RunCrank relay voltage	voltage_feedback > 5.00 [V]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Enable_ON interface is true; No electrical fault detected on glow plugs; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; VeGLOO_b_GlowPlugEnbl = TRUE; VeGLOO_b_ElectFlt = FALSE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	40.00 fail samples over 80.00 samples Time task: 50 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit	P0403	This monitor checks if the HP EGR commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from fully closed (default position)			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Performance	P0404	This monitor detects an obstruction on the actuator (obstruction found during the HP EGR valve opening or closing) checking the setpoint position against the position measured by the HP EGR Position Sensor	|HP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	>15.00 [%]	Test enabled by calibration	==1.00	960.00 fail counts out of 1,200.00 sample counts 480.00 fail counts to enable the open circuit check (P0403) Function task: 6.25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>=30.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-20.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HP EGR position setpoint in steady state conditions for minimum time	>-50.00 [%/s] <50.00 [%/s] for >=0.38 [s]		
					HP EGR position closed loop control active			
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			
					No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	EGR_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Sensor Circuit Low Voltage (SENT position sensor)	P0405	This monitor checks if the HP EGRSENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	<1.00 [%5V]	Test enabled by calibration	==1.00	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					SENT position sensor present	==1.00		
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					No fault on SENT communication	EGR_SENT_LossCommFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Sensor Circuit High Voltage (SENT position sensor)	P0406	This monitor checks if the HP EGR SENT position sensor is out of electrical range high	SENT position raw voltage > high threshold	>99.00 [%5V]	Test enabled by calibration	==1.00	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					SENT position sensor present	==1.00		
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					No fault on SENT communication	EGR_SENT_LossCommFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Stuck Open	P042E	This monitor detects the HP EGR valve mechanically stuck in a certain position different from its defaulted position (fully closed) when the actuator is no longer driven (missing dafaulted position)	Measured HP EGR position > maximum threshold	>6.00 [%]	P0404 is already set		No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips
					Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position)	>2.00 [s]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation	EGR_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Position Sensor Circuit Low Voltage (SENT position sensor)	P044C	This monitor checks if the LP EGRSENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	< 1.00 [%5V]	Test enabled by calibration SENT position sensor present System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) No fault on SENT communication	==1.00 ==1.00 >11.00 [V] LPE_SENT_LossCommFlt ==FALSE	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Position Sensor Circuit High Voltage (SENT position sensor)	P044D	This monitor checks if the LP EGRSENT position sensor is out of electrical range high	SENT position raw voltage > high threshold	>99.00 [%5V]	Test enabled by calibration	==1.00	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					SENT position sensor present	==1.00		
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					No fault on SENT communication	LPE_SENT_LossCommFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Control Circuit	P045A	This monitor checks if the LP EGR commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is OFF Valve requested in a position different from fully closed (default position) Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Position Performance	P045B	This monitor detects an obstruction on the actuator (obstruction found during the LP EGR valve opening or closing) checking the setpoint position against the position measured by the LP EGR Position Sensor	|LP EGR Position Tracking Error| (setpoint position - measured position) > maximum threshold	>10.00 [%]	Test enabled by calibration	==1.00	960.00 fail counts out of 1,200.00 sample counts 480.00 fail counts to enable the open circuit check (P045A) Function task: 6.25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>=30.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-20.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					LP EGR position setpoint in steady state conditions for minimum time	>-50.00 [%/s] <50.00 [%/s] for >=0.35 [s]		
					LP EGR position closed loop control active			
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			
					No faults present on LP EGR position sensor, LP EGR valve, LP EGR position control deviation	LPE_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Control Circuit High Voltage	P045D	This monitor checks if the LP EGR commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Control Stuck Open	P045E	This monitor detects the LP EGR valve mechanically stuck in a certain position different from its defaulted position (fully closed) when the actuator is no longer driven (missing dafaulted position)	Measured LP EGR position > minimum threshold	>30.00 [%]	P045B is already set		No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips
					Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position)	>2.00 [s]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					No faults present on LP EGR position sensor, LP EGR valve, LP EGR position control deviation	LPE_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Control Circuit	P0475	This monitor checks if the ETV commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is OFF			
					Valve requested in a position different from fully open (default position)			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Position Performance	P0476	This monitor detects an obstruction on the actuator (obstruction found during the ETV opening or closing) checking the setpoint position against the position measured by the ETV Position Sensor	|ETV Position Tracking Error| (setpoint position - measured position) > maximum threshold	>10.00 [%]	Test enabled by calibration	==1.00	960.00 fail counts out of 1,200.00 sample counts 480.00 fail counts to enable the open circuit check (P0475) Function task: 6.25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening)	>=30.00 [°C]		
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					Outside air temperature higher or equal to minimum threshold	>=-20.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					ETV position setpoint in steady state conditions for minimum time	>-100.00 [%/s] <100.00 [%/s] for >=0.50 [s]		
					ETV position closed loop control active			
					No mechanical stop soft approach in progress			
					No anti-sticking procedure in progress			
					No faults present on ETV position sensor, ETV valve, ETV position control deviation	LEV_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Control Circuit High Voltage	P0478	This monitor checks if the ETV commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	>8 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Control Stuck Closed	P048A	This monitor detects the ETV mechanically stuck in a certain position different from its defaulted position (fully open) when the actuator is no longer driven (missing dafaulted position)	Measured ETV position < maximum threshold	<70.00 [%]	P0476 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Diagnostic system enabled (no clear code or EOT in progress) No faults present on ETV position sensor, ETV valve, ETV position control deviation	 >2.00 [s] LEV_PstnShtOffReq ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Position Sensor Circuit Low Voltage (SENT position sensor)	P048D	This monitor checks if the ETV SENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	<1.00 [%5V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) No fault on SENT communication	==1.00 >11.00 [V] LEV_SENT_LossCommFlt ==FALSE	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Position Sensor Circuit High Voltage (SENT position sensor)	P048E	This monitor checks if the ETV SENT position sensor is out of electrical range high	SENT position raw voltage > high threshold	>99.00 [%5V]	Test enabled by calibration	==1.00	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					No fault on SENT communication	LEV_SENT_LossCommFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit High Voltage	P0490	This monitor checks if the HP EGR commands are shorted to power supply	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Position Exceeded Learning Limit (SENT position sensor)	P049D	This monitor checks if the HP EGRSENT position sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold	<5.00 [%5V] OR >12.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed position has been successfully completed: - engine coolant temperature in range; - no faults present on engine coolant temperature sensor; - outside air temperature above a threshold; - no faults present on outside air temperature sensor. Position control in closed loop: battery voltage above a threshold No faults present on HP EGR position sensor, HP EGR valve, HP EGR position control deviation End Of Trip event has elapsed	==1.00 >=30.00 [°C] <=150.00 [°C] ECT_Sensor_FA ==FALSE >=-40.00 [°C] OAT_PtEstFiltFA ==FALSE >=9.50 [V] EGR_PstnShtOffReq ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diagnostic system enabled (no clear code or EOT in progress)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Position Exceeded Learning Limit (SENT position sensor)	P049E	This monitor checks if the LP EGRSENT position sensor has an offset with respect to the nominal positions where the valve does the learning procedure (fully closed and/or fully open)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold OR SENT position raw voltage when the valve is in wide open position < low threshold OR SENT position raw voltage when the valve is in wide open position > high threshold	<7.00 [%5V] OR >12.50 [%5V] OR <0.00 [%5V] OR >100.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: - engine coolant temperature in range; - no faults present on engine coolant temperature sensor; - outside air temperature above a threshold; - no faults present on outside air temperature sensor. Position control in closed loop: battery voltage above a threshold No faults present on LP EGR position sensor, LP EGR valve, LP EGR position control deviation End Of Trip event has elapsed	==1.00 >=30.00 [°C] <=150.00 [°C] ECT_Sensor_FA ==FALSE >=-40.00 [°C] OAT_PtEstFiltFA ==FALSE >=9.50 [V] LPE_PstnShtOffReq ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diagnostic system enabled (no clear code or EOT in progress)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor C Circuit Range/ Performance	P04CF	This monitor checks if the LP EGR up air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time.	LP EGR up air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples. Temperature difference (absolute value)	 >20.00 [°C]	Test enabled by calibration Key on and engine not running or engine running for less than a calibratable time Engine not cranking Runk Crank Relay voltage in range The engine has not run for a calibratable time since last key off No faults detected on engine off timer Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold Sensor Performance Check not yet completed in current driving cycle No faults detected on	1.00==TRUE < 2.00 [s] ==TRUE >11.00 [V] >28,800.00 [s] EngineModeNotRunTimer Error ==FALSE < 20.00 [°C] ==TRUE MnfdTempSensorFA	The averaged temperatures are calculated over 10.00 samples. No debounce is present: DTC sets as soon as the error is present Functional task: at key on	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					intake manifold air temperature sensor	==FALSE		
					No faults detected on fuel temperature sensor	FTS_FTS_Flt==FALSE		
					No electrical or intermittent fault detected on LP EGR up air temperature sensor	LPE_TempSnsrCktFA ==FALSE LPE_TempSnsrSelfCorFA ==FALSE		
					No fuel-operated parking heater detected	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor C Circuit Low	P04D0	This monitor checks if the LP EGR up temperature sensor is out of electrical range low.	LP EGR up temperature raw resistance < low threshold	< 7.00 [ohm]	Test enabled by calibration	1.00==TRUE	30.00 fail counts out of 38.00 sample counts	Type A, 1 Trips
					Engine not cranking	==TRUE		
					Runk Crank Relay voltage in range	> 11.00 [V]	Functional task: 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor C Circuit High	P04D1	This monitor checks if the LP EGR up temperature sensor is out of electrical range high.	LP EGR up temperature raw resistance > high threshold	> 20,000,000.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	1.00==TRUE ==TRUE > 11.00 [V]	30.00 fail counts out of 38.00 sample counts Functional task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR Temperature Sensor C Circuit Intermittent/ Erratic	P04D2	This monitor checks if the LP EGR up air temperature sensor has an intermittent fault.	LP EGR up air temperature value > T_MAX_threshold OR LP EGR up air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading -T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	> 320.00 [°C] < -60.00 [°C]	Test enabled by calibration Engine not cranking Run Crank Relay voltage in range No electrical faults detected on LP EGR up air temperature sensor	1.00==TRUE ==TRUE >11.00 [V] LPE_TempSnsrCktFA ==FALSE	60.00 fail counters over 75.00 sample counters Functional task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EGR "A" Control Temperature Too High	P04FA	This monitor checks if the temperature of the HP EGR DC-Motor increases too much (e.g. HP EGR DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring Low	P0545	This monitor has the purpose of warning the system/driver that an electrical problem on EGT 1 sensor is present. Failure mode: Out Of Range Low (short circuit to ground) The monitor compares the EGT raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected.	The monitor compares the EGT 1 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected.	<125 [Ohm]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status	1 [Boolean] == FALSE == TRUE == TRUE == FALSE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 out of range monitoring High	P0546	This monitor has the purpose of warning the system/driver that an electrical problem on EGT 1 sensor is present. Failure modes: Out Of Range High (open circuit, short circuit to supply, broken wiring) The monitor compares the EGT raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected.	The monitor compares the EGT 1 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected.	>1,000 [Ohm]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status	1 [Boolean] == FALSE == TRUE == TRUE == FALSE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Idle Control System - Fuel Quantity Lower Than Expected	P054E	This DTC detects if the fuel quantity of the torque forming pulses is lower than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode		**For enabling the monitor, all the following conditions must be satisfied continuously for more than**	4.00 [s]	86.00 failures out of 172.00 samples 1 sample every cylinder firing event	Type B, 2 Trips
			case **StrongExhGasWarmUp:** { transmission in Gear: Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature	Test enabled by calibration	1.00 [Boolean]		
					and current gear	unchanged		
			transmission in Park/ Neutral: Fuel quantity of the torque forming pulses	< 0.5* **P054E_IFM_MinFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature	and depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark (			
					CeFULR_e_InGear: transmission	in gear		
					CeFULR_e_NeutralPark: transmission	in park/neutral		
			}		CeFULR_e_InGearNeutralPark: transmission)	in gear and in park neutral		
			case **SoftExhGasWarmUp:** { transmission in Gear: Fuel quantity of the torque forming pulses	<0.5* **P054E_IFM_MinFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant	and engine speed	> hysteresis(511.00 , 511.00 + 5.00)[rpm]		
					and engine speed	<hysteresis(1,560.00 , 1,560.00 + 5.00)[rpm]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				temperature	and			
			<u>transmission in Park/ Neutral:</u> Fuel quantity of the torque forming pulses	<0.5* **P054E_IFM_MinFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature	(OBD Coolant Enable Criteria	== TRUE		
					OR			
					engine coolant temperature	> hysteresis(-21.00 , -20.00) [°C]		
					)			
			}					
			case **HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):**		and outside air temperature	> hysteresis(-21.00 , -20.00) [°C]		
					and vehicle speed	< 3.00 [kph]		
			{ <u>transmission in Gear:</u> Fuel quantity of the torque forming pulses	<0.5* **P054E_IFM_MinFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature	and enabled in the combustion mode	**P054E_IFM_CombModesEnbl**		
					and Accelerator Pedal Position	<=0.05 [%]		
			<u>transmission in Park/ Neutral:</u> Fuel quantity of the torque forming pulses	<0.5* **P054E_IFM_MinFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature	and Engine running	-		
					and PTO_PTO_Active	== 0 [Boolean]		
					and Run Crank voltage	>=11.00 [V]		
			}		and if the transmission is manual			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

			default:
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				<0.5* **P054E_IFM_MinFuelldleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				<0.5* **P054E_IFM_MinFuelldleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
					OR
					the clutch pedal position
					)
					NLT_Active
					
					and
					No active DTC's:
					
					No Neutral Locked Turbine Fault active and Fault Pending:
					VeTLKR_b_NLT_ActvFA
					AND
					VeTLKR_b_NLT_ActvFP
					
					Depending on the **OAT Source Calibration =**
					CeOATR_e_ECM_OAT_Sensor
					(
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					)
						
						> 75.00
						
						< 15.00
						
						==0 [Boolean]
						
						==0 [Boolean]
						==0 [Boolean]
						
						OAT_OAT_SnsrNonEmissFA
						
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						
						ECT_Sensor_FA
						
						Transmission Estimated Gear Validity
						
						VehicleSpeedSensor_FA
						
						AcceleratorPedalFailure
						
						ClutchPedalPosSensor_FA
						
						(FUL_GenericlnjSysFA
						AND
						FUL_GenericlnjSysFlt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Idle Control System - Fuel Quantity Higher Than Expected	P054F	This DTC detects if the fuel quantity of the torque forming pulse is higher than the expected fuel quantity request when the engine is idle. Depending on combustion mode and gear, different maps of fuel quantity thresholds can be used. Each map depends on engine speed and engine coolant temperature	Depending on Combustion Mode
			
			case **StrongExhGasWarmUp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			}
			
			case **SoftExhGasWarmllp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				> 1.5* **P054F_IFM_MaxFuelldleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelldleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelldleV2_G** [mm^3] depending on engine speed and engine coolant temperature
					For enabling the monitor, all the following conditions must be satisfied continuously for more than
					
					Test enabled by calibration
					
					and
					current gear
					
					and
					depending on **Gear Selection Calibration =** CeFULR_e_InGearNeutralPark
					{
					CeFULR_e_InGear:
					transmission
					
					CeFULR_e_NeutralPark:
					transmission
					
					CeFULR_e_InGearNeutralPark:
					transmission
					}
					
					and
					engine speed
					
					and
					engine speed
					
					and
						4.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(511.00 , 511.00 + 5.00) [rpm]
						
						< hysteresis(1,560.00 , 1,560.00 + 5.00) [rpm]
							86.00 failures out of 172.00 samples
							
							1 sample every cylinder firing event
								Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case
			HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			default:
				> 1.5* **P054F_IFM_MaxFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature
					{
					OBD Coolant Enable Criteria
					
					OR
					engine coolant temperature
					
					}
					
					and
					outside air temperature
					
					and
					vehicle speed
					
					and
					enabled in the combustion mode
					
					and
					Accelerator Pedal Position
					
					and
					Engine running
					
					and
					PTO_PTO_Active
					
					and
					Run Crank voltage
					
					and
					if the transmission is manual
					(
					if the Gear is Neutral
					AND
					the clutch pedal position
						== TRUE
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						> hysteresis(-21.00 , -20.00) [°C]
						
						< 3.00 [kph]
						
						P054F_IFM_CombModesEnbl
						
						<=0.05 [%]
						
						-
						
						== 0 [Boolean]
						
						>= 11.00 [V]
						
						>75.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
				
				> 1.5* **P054F_IFM_MaxFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054F_IFM_MaxFuelIdleC1_PN** [mm^3] depending on engine speed and engine coolant temperature
					OR
					the clutch pedal position
					)
					NLT_Active
					and
					No active DTC's:
					
					No Neutral Locked Turbine Fault active and Fault Pending: VeTLKR_b_NLT_ActvFA AND VeTLKR_b_NLT_ActvFP
					Depending on the **OAT Source Calibration =** CeOATR_e_ECM_OAT_Sensor
					{
					CeOATR_e_NonOBD_NonECM_NonVICM:
					
					default:
					}
						<15.00
						
						==0 [Boolean]
						
						==0 [Boolean]
						==0 [Boolean]
						OAT_OAT_SnsrNonEmissFA
						OAT_PtEstFiltFA
						
						CrankSensor_TFTKO
						ECT_Sensor_FA
						Transmission Estimated Gear Validity
						VehicleSpeedSensor_FA
						AcceleratorPedalFailure
						ClutchPedalPosSensor_FA
						(FUL_GenericlnjSysFA AND FUL_GenehclnjSysFlt
						)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Injection Timing Performance	P05EC	This DTC detects an injection timing only fault in Cold Start condition by comparison of the requested Start of Injection by Application SW and the scheduled SOI by HWIO SW.	Comparison of the requested Start Of Injection by Application SW and the scheduled SOI by HWIO SWfor all cylinders.	< -5.00 OR >5.00	Test enabled by calibration AND Engine Speed in range AND At least one injection pulse is commanded by Application SW on all cylinders in the previous engine cycle FUL_FuelInjectedCyl_CiEPSR_CylinderA FUL_FuelInjectedCyl_CiEPSR_CylinderB FUL_FuelInjectedCyl_CiEPSR_CylinderC FUL_FuelInjectedCyl_CiEPSR_CylinderD FUL_FuelInjectedCyl_CiEPSR_CylinderE FUL_FuelInjectedCyl_CiEPSR_CylinderF FUL_FuelInjectedCyl_CiEPSR_CylinderG FUL_FuelInjectedCyl_CiEPSR_CylinderH AND At least one injection pulse is commanded by HWIO OR at least one post injection is commanded by Application SW, on all cylinders in the previous engine cycle	== 1.00 > 400 [rpm] AND < 3,000.00 ==TRUE; -	280.00 failures out of 400.00 samples 1 sample every engine revolution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No information of dropped pulse reported by HWIO AND No electrical fault on injectors are present AND No Injection Controller Fault AND No faults on crankshaft sensor for the entire driving cycle. AND Cold Start Strategy enabled	FUL_FuelInjCkt_FA FUL_CntrlStFA CrankSensor_FA AND CrankSensor_TFTKO == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger/ Supercharger Boost Control "A" Temperature Too High (Single and Two stage VGT DC Motor)	P05FD	This monitor checks if the temperature of the VGT DC-Motor increases too much (e.g. VGT DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range HWIO error status different from INDETERMINATE status	==1.00 > 11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC Diagnoses the internal fuel injector control module circuit for circuit faults. The following check are performed: - Chip initialization - Boost voltage - chip test - Code and Parameter - SPI error (SPI communication failed) -ASIC Supply Under/ Over Voltage -ASIC Configuration Register Error -ASIC SPI Fault -ASIC DC-DC Over Voltage/Current -ASIC external clock lost - Injector Timeout Reached - Injector RAM Corruption	Driver Status OR (Driver Status for a number of samples)	== FAILED (chip test not passed OR Wrong download of microcode OR SPI error) == NOT INITIALIZED (chip not initialized OR Boost Voltage < 40.00) > 10 samples	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	19 failures out of 38 samples 12.5 ms / sample Continuous	Type A, 1 Trips
			Driver Status	== FAILED (ASIC power supply voltage is < 4.5 V or >33 V)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	
			Driver Status	== FAILED (Injector control circuit configuration register corrupted)	Test enabled by calibration; and Battery voltage and Key ON	== 1 [Boolean] > 6.41 [V] -	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and Engine is not cranking and Boost Voltage has achieved (at least one time)	- 40.00 [V]		
			Driver Status	== FAILED (SPI Communicatio error)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	
			Driver Status	== FAILED (the Boost converter voltage or current are out of range)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Driver Status	== FAILED (Injector control circuit external clock is no longer available)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	8.00 failures out of 16.00 samples 12.5 ms / sample Continuous	
			Driver Status	== FAILED (the injector has been commanded ON for a time > 8,000.00 us)	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Boost Voltage has achieved (at least one time)	== 1 [Boolean] > 6.41 [V] - - 40.00 [V]	**P062B_CSM_ASIC_TimeOutReached_FailLim** failures out of **P062B_CSM_ASIC_TimeOutReached_SmplLim** samples LoresC	
			Driver Status	== FAILED (Injector control circuit SPRAM and DPRAM corrupted)	Test enabled by calibration; and Battery voltage and Key ON	== 1 [Boolean] > 6.41 [V] -	**P062BCSMASIC_RAMCorruptionFailLim** failures out of **P062BCSMASIC_RAMCorruptionSmplLim** samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and Engine is not cranking and Boost Voltage has achieved (at least one time)	- 40.00 [V]	LoresC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Injector Driver Circuit Performance Bank 1	P062D	This DTC detects if there is: open circuit of the power supply line of the injector or Boost voltage fault or ECU internal fault The monitoring determines if the boost voltage is above a threshold or below another threshlod with hysteresis	Internal ECU Boost Voltage	> 60.00 [V] OR < hysteresis(40.00 , 41.00) [V]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking	== 1 [Boolean] > 11.00 [V] - -	37 failures out of 74 samples 6.25 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Glow Plug Circuit Low	P066A	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Glow Plug Circuit High	P066B	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohm a power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohm a power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2 = 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Glow Plug Circuit Low	P066C	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Glow Plug Circuit High	P066D	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Glow Plug Circuit Low	P066E	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Glow Plug Circuit High	P066F	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Glow Plug Circuit/Open	P0671	This DTC checks the circuit for electrical integrity during operation. Glow plug 1 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Glow Plug Circuit/Open	P0672	This DTC checks the circuit for electrical integrity during operation. Glow plug 2 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Glow Plug Circuit/Open	P0673	This DTC checks the circuit for electrical integrity during operation. Glow plug 3 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Glow Plug Circuit/Open	P0674	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Glow Plug Circuit/Open	P0675	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Glow Plug Circuit/Open	P0676	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin open load.	Test performed by HWIO. An open circuit condition shall be detected if the circuit attached to the Controller external connection has an impedance R and shall not be detected if the circuit impedance is less than the Ropmin	R = 200 [kOhm] Ropmin = 16 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Glow Plug Circuit Low	P067A	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Glow Plug Circuit High	P067B	This DTC checks the circuit for electrical integrity during operation. Glow plug 4 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Glow Plug Circuit Low	P067C	This DTC checks the circuit for electrical integrity during operation. Glow plug 5 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Glow Plug Circuit High	P067D	This DTC checks the circuit for electrical integrity during operation. Glow plug 5 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Glow Plug Circuit Low	P067E	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin short to ground.	Test performed by HWIO A ground short condition shall be detected if the circuit attached to the controller external connection has an impedance Rshortdet to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND. A ground short condition shall not be detected if the circuit impedance is higher than Rload_min. A ground short condition will be set in case of Inrush overcurrent detection. It is intended to detect if the Inrush current profile is beyond the specified value (see **Inrush_current_profile** Table). This detection is only done at key on (once per driving cycle).	Rshortdet = 0.11 [Ohm] Rload_min = 0.19 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Duty cycle above a calibratable threshold; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO 2.00 [%] VeDRER_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Glow Plug Circuit High	P067F	This DTC checks the circuit for electrical integrity during operation. Glow plug 6 pin short to high voltage.	Test performed by HWIO • If the Load resistance is higher than 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R1 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range. • If the Load resistance is between 0.2 Ohm to 0.65 Ohma power short condition shall be detected if the circuit attached to the Controller external connection has an impedance below R2 to a voltage source within the Normal Operating Voltage Range or the High Operating Voltage Range.	R1 = 0.5 [Ohm] R2= 0.14 [Ohm]	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; No faults detected on glow plug system supply; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_b_DiagSystemDsbl = FALSE;	10.00 fail samples over 20.00 samples Time task: 100 [ms]	Type B, 2 Trips + glow lamp ON

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 electrical resistance rationality check	P06C5	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 1 electrical resistance is outside a calibratable range	0.58 < NaGLOD_R_GlowPlug <2.38	Test enabled by calibration;	1.00	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips
					Diagnostic system is not disabled;	VeDRER_b_DiagSystemDsbl = FALSE;		
					Key on and engine running (cranking excluded);	VePMDR_b_R unCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE;		
					Battery voltage in range;	VeLVTR_b_RunCrankIgnlnRange = TRUE;		
					Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug);	VaGLOD_b_GlowPlugOn = TRUE; 4.00		
					No fault on glow plugs voltage feedback circuitry;	VeGLOD_b_RunCrankVoltRec = FALSE;		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 electrical resistance rationality check	P06C6	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 2 electrical resistance is outside a calibratable range	0.58 < NaGLOD_R_GlowPlug <2.38	Test enabled by calibration;	1.00	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips
					Diagnostic system is not disabled;	VeDRER_b_DiagSystemDsbl = FALSE;		
					Key on and engine running (cranking excluded);	VePMDR_b_R unCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE;		
					Battery voltage in range;	VeLVTR_b_RunCrankIgnlnRange = TRUE;		
					Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug);	VaGLOD_b_GlowPlugOn = TRUE; 4.00		
					No fault on glow plugs voltage feedback circuitry;	VeGLOD_b_RunCrankVoltRec= FALSE;		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 electrical resistance rationality check	P06C7	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 3 electrical resistance is outside a calibratable range	0.58 < NaGLOD_R_GlowPlug <2.38	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 electrical resistance rationality check	P06C8	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.58 < NaGLOD_R_GlowPlug <2.38	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystem Dsbl = FALSE; VePMDR_b_R unCrankAc tive = TRUE; VeEMDR_b_EngModeCra nk = FALSE; VeLVTR_b_RunCrankIgnl nRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVol tRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 electrical resistance rationality check	P06C9	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.58 < NaGLOD_R_GlowPlug <2.38	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystem Dsbl = FALSE; VePMDR_b_R unCrankAc tive = TRUE; VeEMDR_b_EngModeCra nk = FALSE; VeLVTR_b_RunCrankIgnI nRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVol tRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 electrical resistance rationality check	P06CA	Test aim is to detect when individual glow plug no longer operates within the manufacturer's specified limits for normal operation. Glow plug electrical resistance is calculated as a ratio between voltage measure and current measure.	An error shall be detected when glow plug 4 electrical resistance is outside a calibratable range	0.58 < NaGLOD_R_GlowPlug <2.38	Test enabled by calibration; Diagnostic system is not disabled; Key on and engine running (cranking excluded); Battery voltage in range; Glow plug is commanded on for a calibratable time (Glow Plug system is enabled, no electrical fault on individual glow plug); No fault on glow plugs voltage feedback circuitry;	1.00 VeDRER_b_DiagSystemDsbl = FALSE; VePMDR_b_R unCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; VaGLOD_b_GlowPlugOn = TRUE; 4.00 VeGLOD_b_RunCrankVoltRec = FALSE;	15.00 fail samples over 25.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge rVGTA Initial Position Exceeded Learning Limit (Single and Two stage VGT DC Motor)	P100B	This monitor checks if the positions of the VGT DC Motor open / closed mechanical stops measured at End Of Line during the learning procedure are plausibile	SENT position raw voltage when the valve is in fully closed position (learned at supplier plant) < low threshold OR SENT position raw voltage when the valve is in fully closed position (learned at supplier plant) > high threshold OR SENT position raw voltage when the valve is in wide open position (learned at supplier plant) < low threshold OR SENT position raw voltage when the valve is in wide open position (learned at supplier plant) > high threshold OR SENT position raw voltage when the valve is at the minimum flow position (learned at supplier plant) < low threshold OR	<72.00 [%5V] OR > 89.00 [%5V] OR <0.00 [%5V] OR > 100.00 [%5V] OR <70.00 [%5V] OR	Test enabled by calibration End Of Line Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: No faults present on VGT position sensor, VGT valve, VGTposition deviation.	== 1.00 VGT_PstnSnsrFA ==FALSE VGT_ActCktFA==FALSE VGT_PstnCntrlFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at EOL	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			SENT position raw voltage when the valve is at the minimum flow position (learned at supplier plant) > high threshold OR SENT position raw voltage when the valve is in fully closed position (learned at End Of Line) < low threshold OR SENT position raw voltage when the valve is in fully closed position (learned at End Of Line) > high threshold OR SENT position raw voltage when the valve is in wide open position (learned at End Of Line) < low threshold OR SENT position raw voltage when the valve is in wide open position (learned at End Of Line) > high threshold	>74.00 [%5V]OR OR < 72.00 [%5V] OR > 89.00 [%5V] OR <14.00 [%5V] OR >32.00 [%5V]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injection Quantity Monitoring	P1037	This monitor detects failures in the application of the correct coolant compensations to fuel injection system setpoint during cold start. The injection system diagnostic monitors that energizing time programmed by the SW for each injection pulse (that is the fuel quantity) is correctly driven by the ECU (ET width and sequence for each stroke and for each cylinder are checked).	In order to identify whether there is a fault on an injector, the following tests shall be performed: 1. At least one dropped pulse is present (i.e. at least one pulse programmed by the application software is not driven by the ECU) 2. |ETpulseX,programmed (cyl) - ET pulseX,HWIO (cyl)| > calibratable threshold where: ETpulseX,HWIO (cyl)) = energizing time feedback read by HWIO for pulseX and on cylinder cyl ETpulseX,programmed (cyl) = ETpulseX,SW (cyl) + EOIpulseX,HWIO (cyl) = energizing time programmed by SW for pulseX and on cylinder cyl (end of injection is not included) + end of injection feedback read by HWIO for pulseX and on cylinder cyl		Test enabled by calibration Powertrain relay voltage in range Engine is running Catalyst Warm-Up Boolean from CSERS should be enabled (it takes into account the combustion mode, the minimum soaking time and ECT limit) CSE_CatalystWarmupEnabled No monitoring Shutoff conditions present (no FA on Boost Voltage monitoring, Injector Electrical monitorings, Pull In Period monitoring, and Controller Status monitoring) FUL_BoostVoltFA FUL_FuelInjCkt_FA FUL_PullInErrFA FUL_CntrlrStFA At least one injection pulse is requested by the application SW FUL_FuelInjected	== 0.00 [Boolean] > 11.00[V] == TRUE [Boolean] == TRUE [Boolean] == FALSE [Boolean] == FALSE [Boolean] == FALSE [Boolean] == FALSE [Boolean] == TRUE [Boolean]	60.00 failures of 30.00 samples Function task: angular based	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Rail Pressure deviation during cut off	P1089	This diagnosis is able to check if, during SQA learning, the pressure set-point requested by SQA is correctly reached and maintained (in rail pressure range defined for SQA), in order to allow SQA to perform the learning.	Fuel Rail pressure	> SQA Rail Pressure Set-point + **KaFADC_p_SQA_Lrn Delt** OR < SQA Rail Pressure Set-point - **KaFADC_p_SQA_Lrn Delt**	Test enabled by calibration All enabling conditions for SQA learning different from Rail Pressure in range are satified Calibrateable delay time since SQA started to request rail pressure set-point has expired.	1.00 FAD_SQA_LrnPresEnbl 2,000.00	800.00 Fail Samples over 1,143.00 samples. 1 Sample every 12,5ms.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Control Circuit Shorted	P10C0	This monitor checks if the ETV commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	>8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Control Actuator Control Circuit Shorted (Swirl DC Motor)	P10C1	This monitor checks if the Swirl commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is ON			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Performance	P10D5	This monitor checks if the CAC down air temperature sensor is irrational at key on when compared with two reference temperature sensors after a long soak time	Charge air cooler down air temperature is compared at power up with an average temperature calculated using the intake manifold air temperature sensor and the fuel temperature sensor over a calibratable number of samples	>20.00 [°C]	Enablement calibration set to TRUE	==1.00	Test executed after a counter of 10.00 samples Functional task: 100 ms	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	<2.00 [s]		
					Runk Crank Relay voltage in range	> 11.00 [V]		
					The engine has not run for a calibratable time since last key off	>=28,800.00 [s]		
					No faults detected on engine off timer	EngineModeNotRunTimer Error ==FALSE		
					Absolute value of the difference between intake manifold air temperature and fuel temperature smaller than a calibratable threshold	<45.00 [°C]		
					No electrical or self-correlated faults detected on charge air cooler down air temperature sensors	CIT_CAC_DwnCktFA ==FALSE OR CIT_CAC_DwnSelfCorFA ==FALSE		
					No faults detected on intake manifold air	MnfdTempSensorFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature sensor			
					No faults detected on fuel temperature sensor	FTS_FTS_Flt==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Low	P10D6	This monitor checks if the CAC down air temperature sensor is out of electrical range low	Charge air cooler down air temperature resistance value < low threshold	<250.00 [ohm]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range	==1.00 > 11.00 [V]	30.00 fail counter over 38.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit High	P10D7	This monitor checks if the CAC down air temperature sensoris out of electrical range high	Charge air cooler down air temperature resistance value > high threshold	>20,000,000.00 [ohm]	Test enabled by calibration	==1.00	30.00 fail counter over 38.00 sample counter	Type B, 2 Trips
					Engine not cranking			
					Runk Crank Relay voltage in range	> 11.00 [V]	Functional task: 100 ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Charge Air Cooler Temperature Sensor Down Circuit Intermittent/ Erratic	P10D8	This monitor checks if the CAC down air temperature has an intermittent fault	Charge air cooler down air temperature value > T_MAX_threshold OR Charge air cooler down air temperature value < T_MIN_threshold where - T_MAX_threshold = (1 - alpha)*T_MAX + alpha*T_last_good - T_MIN_threshold = (1 - alpha)*T_MIN + alpha*T_last_good - alpha = e^(#fails + 1)*(ts/ tau) - #fails = number of consecutive samples where the test failed - ts = sensor sampling time - tau = sensor filter response time - T_MAX = sensor maximum actual reading -T_MIN = sensor minimum actual reading - T_last_good = last good temperature measured by the sensor	>300.00 [°C] <-60.00 [°C]	Test enabled by calibration Engine not cranking Runk Crank Relay voltage in range No electrical faults detected on CAC down air temperature sensor	==1.00 >11.00 [V] CIT_CAC_DwnCktFA ==FALSE	60.00 fail counter over 75.00 sample counter Functional task: 100 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Current Range/ Performance	P10EB	This monitor checks if an excessive current flows through the ETV DC-Motor (e.g. shunt circuit between load, ETV DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					No faults present on ETV DC Motor current range/ performance	LEVJMtrCurrLimTFTKO ==FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Control Actuator Driver Current High (Swirl DC Motor)	P10EC	This monitor checks if an excessive current flows through the Swirl DC-Motor (e.g. shunt circuit between load, Swirl DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is ON			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Control Actuator Driver Temperature Too High	P10ED	This monitor checks if the temperature of the Swirl DC-Motor increases too much (e.g. Swirl DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 plausibility at key on monitoring	P113B	This function has the purpose of warning the system/driver that EGT 1 sensor behavior is not plausible, considering the signal value after a soaking phase and comparing it with a reference expected signal. Failure modes: - Sensor internal malfunctions (offset or drift) - Wiring harness deterioration - ECU input logic fault EGT sensor value (converted raw signal) is not comparable with the expected average temperature measured by other temperature sensors at the beginning of the driving cycle; current temperature value read by the sensor shall not differ from the average for a maximum calibratable amount that is selected between a reference value evaluated with NO parking heater strategy active and a value estimated in case the parking heater strategy active. The average value is evaluated considering:	EGT 1 sensor value (converted raw signal) is not comparable with the expected average temperature (EGT_Avg) calculated starting by other temperature sensors measures at the beginning of the driving cycle; current temperature value read by the sensor differs from the average for a maximum calibratable amount that is selected between a reference value evaluated with NO parking heater strategy active and a value estimated in case the parking heater strategy active.	> 24 [°C]	Monitor enabled by dedicated calibration AND Supply voltage in range AND No electrical checks failed last key on AND Punctual electrical errors affecting the sensor AND Diagnostic system reset status AND Rationality check run at last key on AND Fuel fired heater detection state not unknown/ delayed OR parking heater strategy for temperature sensor rationality monitoring not enabled AND Reference temperature calculation completion	1 [Boolean] ==TRUE EGT_ExhGas1_CktTFTK 0 ==FALSE ==FALSE ==FALSE ==TRUE ==TRUE	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		engine coolant temperature, fuel temperature, ambient air temperature, intake air temperature, catalyst up and down temperature, SCR down temperature, particulate filter up and down temperature, maximum and minimum read temperature values. The monitor runs at the first key on after a soaking phase.			status, in particular: - Minimum engine-off time AND - Minimum number of available sensors	 > 28,800.00 [s] >= 4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 plausibility at key on monitoring	P113C	This function has the purpose of warning the system/driver that EGT 2 sensor behavior is not plausible, considering the signal value after a soaking phase and comparing it with a reference expected signal. Failure modes: - Sensor internal malfunctions (offset or drift) - Wiring harness deterioration - ECU input logic fault EGT sensor value (converted raw signal) is not comparable with the expected average temperature measured by other temperature sensors at the beginning of the driving cycle; current temperature value read by the sensor shall not differ from the average for a maximum calibratable amount that is selected between a reference value evaluated with NO parking heater strategy active and a value estimated in case the parking heater strategy active. The average value is evaluated considering:	EGT 2 sensor value (converted raw signal) is not comparable with the expected average temperature (EGT_Avg) calculated starting by other temperature sensors measures at the beginning of the driving cycle; current temperature value read by the sensor differs from the average for a maximum calibratable amount that is selected between a reference value evaluated with NO parking heater strategy active and a value estimated in case the parking heater strategy active.	> 25 [°C]	Monitor enabled by dedicated calibration AND Supply voltage in range AND No electrical checks failed last key on AND Punctual electrical errors affecting the sensor AND Diagnostic system reset status AND Rationality check run at last key on AND Fuel fired heater detection state not unknown/ delayed OR parking heater strategy for temperature sensor rationality monitoring not enabled AND Reference temperature calculation completion	1 [Boolean] ==TRUE EGT_ExhGas2_CktTFTK 0 ==FALSE ==FALSE ==FALSE ==TRUE ==TRUE	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		engine coolant temperature, fuel temperature, ambient air temperature, intake air temperature, catalyst up and down temperature, SCR down temperature, particulate filter up and down temperature, maximum and minimum read temperature values. The monitor runs at the first key on after a soaking phase.			status, in particular: - Minimum engine-off time AND - Minimum number of available sensors	 > 28,800.00 [s] >= 4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 plausibility at key on monitoring	P113D	This function has the purpose of warning the system/driver that EGT 3 sensor behavior is not plausible, considering the signal value after a soaking phase and comparing it with a reference expected signal. Failure modes: - Sensor internal malfunctions (offset or drift) - Wiring harness deterioration - ECU input logic fault EGT sensor value (converted raw signal) is not comparable with the expected average temperature measured by other temperature sensors at the beginning of the driving cycle; current temperature value read by the sensor shall not differ from the average for a maximum calibratable amount that is selected between a reference value evaluated with NO parking heater strategy active and a value estimated in case the parking heater strategy active. The average value is evaluated considering:	EGT 3 sensor value (converted raw signal) is not comparable with the expected average temperature (EGT_Avg) calculated starting by other temperature sensors measures at the beginning of the driving cycle; current temperature value read by the sensor differs from the average for a maximum calibratable amount that is selected between a reference value evaluated with NO parking heater strategy active and a value estimated in case the parking heater strategy active.	> 31 [°C]	Monitor enabled by dedicated calibration AND Supply voltage in range AND No electrical checks failed last key on AND Punctual electrical errors affecting the sensor AND Diagnostic system reset status AND Rationality check run at last key on AND Fuel fired heater detection state not unknown/ delayed OR parking heater strategy for temperature sensor rationality monitoring not enabled AND Reference temperature calculation completion	1 [Boolean] ==TRUE EGT_ExhGas3_CktTFTK 0 ==FALSE ==FALSE ==FALSE ==TRUE ==TRUE	2 fail samples out of 2 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		engine coolant temperature, fuel temperature, ambient air temperature, intake air temperature, catalyst up and down temperature, SCR down temperature, particulate filter up and down temperature, maximum and minimum read temperature values. The monitor runs at the first key on after a soaking phase.			status, in particular: - Minimum engine-off time AND - Minimum number of available sensors	 > 28,800.00 [s] >= 4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Reference Voltage Circuit	P115E	This diagnosis verifies Engine Out NOx Sensor 02 binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 02 Binary reference voltage (P+ pin)	open circuit on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Reference Voltage Circuit Low Voltage	P115F	This diagnosis verifies Engine Out NOx Sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 02 Binary reference voltage (P+ pin)	groundshort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Reference Voltage Circuit High Voltage	P1160	This diagnosis verifies Engine Out NOx Sensor binary reference voltage pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 02 Binary reference voltage (P+ pin)	powershort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	>11.00V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Signal Circuit	P116A	This diagnosis verifies Engine Out NOx Sensor linear lambda circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 02 Linear pin (P-)	open circuit on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Signal Circuit Low Voltage	P116B	This diagnosis verifies Engine Out NOx Sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 02 Linear pin (P-)	groundshort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Signal Circuit High Voltage	P116C	This diagnosis verifies Engine Out NOx Sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 02 Linear pin (P-)	powershort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Pump Current Control Circuit	P116D	This diagnosis verifies Engine Out NOx Sensor 02 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 02 Reference pin(M1, auxiliary pumping current)	open circuit on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Pump Current Control Circuit Low Voltage	P116E	This diagnosis verifies Engine Out NOx Sensor 02 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 02 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Pump Current Control Circuit High Voltage	P116F	This diagnosis verifies Engine Out NOx Sensor 02 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 02 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Temperature Not Plausible	P118B	This diagnosis detects a soot sensor temperature sensor damaged or a possible parassitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit	The absolute value of the difference between the soot sensor electrode temperature at power-up and the average of temperature sensors (EGT_Avg)	> 30.00 °C	Key is turned on		No time debounce	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					No Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time	> 9.00 V > 0.10s		
					No electrical fault detected on Soot Sensor	NOT(SOT_ElecIFlt)		
					If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass	TPTKO on P1477 TPTKOon P1478		
					Ambient Air pressure	>70.00 KPa		
					Ambient air pressure sensor not faulty	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					Temperature stored at last sensor power up is still reliable			
					Timer since Soot Sensor heating off is not affected	NOT(ModuleOffTimeErr)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					by error on module off timer			
					Calculation of the reference temperature at system start up is valid:	EGTTempAvgVld		
					Minimum time from the previous key off to enable the reference temperature calculation	>28,800.00		
					Diagnostic has not yet reported a pass or failure	NOT (TPTKO OR TFTKO) on P118B		
					Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 1	P118E	This monitor has the purpose of warning the system/driverthat EGT 1 sensor behavior is not plausible, considering the signal value in dynamic conditions and comparing it with a modeled signal. Failure modes: sensor internal malfunctioning (offset or drift). The monitor compares the EGT signal read by the sensor with a modeled temperature signal. If the difference between the temperature values overcomes two calibratable thresholds (highest and lowest allowed difference), an error is detected.	The monitor compares EGT 1 signal read by the sensor with a modeled temperature signal. If the difference between the temperature values overcomes two calibratable thresholds, an error is detected.	>195.97 [°C] OR <-195.97 [°C]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Exhaust manifold pressure reliability flag AND No faults affecting EGT sensors AND Temperature estimation in range AND Engine not running timer error flag	1.00 ==FALSE ==TRUE EGT_ExhGas1_StkFA AND EGT_ExhGas1_StkTFTK0 AND EGT_ExhGas1_CktFA AND EGT_ExhGas1_CktTFTK0 AND EGT_ExhGas1_QckChgFA AND EGT_ExhGas1_QckChgTFTKO > 155.97 [°C] < 700.00 [°C] ==FALSE	6.00 fail samples out of 8.00 over 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND			
					Dynamic check validity	==TRUE		
					AND			
					Temperature estimation not in fault	EGT_EGT1_DiagMdlFlt == FALSE		
					AND			
					Supply voltage in range	> 11.00[V]		
					AND			
					Minimum transition time elapsed after moving from combustion modes affecting the temperature estimation for a long period	>=100.00 [s]		
					AND			
					Minimum transition time elapsed after moving from combustion modes affecting the temperature estimation for a short period	>= 60.00 [s]		
					AND			
					Minimum time elapsed in engine running phase	>= 30.00 [s]		
					AND			
					Limited modeled temperature changing rate, evaluated in a	<25.00 degC over		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					certain time window AND Fuel request and engine speed in range AND Minimum time elapsed once all other enabling conditions are met	CeEGTR_e_IndexMax5000ms **EGT1 DynChk EngPtEnbl** >4.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 2	P118F	This monitor has the purpose of warning the system/driver that EGT 2 sensor behavior is not plausible, considering the signal value in dynamic conditions and comparing it with a modeled signal. Failure modes: sensor internal malfunctioning (offset or drift). The monitor compares the EGT signal read by the sensor with a modeled temperature signal. If the difference between the temperature values overcomes two calibratable thresholds (highest and lowest allowed difference), an error is detected.	The monitor compares EGT 2 signal read by the sensor with a modeled temperature signal. If the difference between the temperature values overcomes two calibratable thresholds, an error is detected.	>156.19 [°C] OR <-156.19 [°C]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Exhaust manifold pressure reliability flag AND No faults affecting EGT sensors AND Temperature estimation in range AND Engine not running timer error flag	1.00 ==FALSE ==TRUE EGT_ExhGas2_StkFA AND EGT_ExhGas2_StkTFTK0 AND EGT_ExhGas2_CktFA AND EGT_ExhGas2_CktTFTK0 AND EGT_ExhGas2_QckChgFA AND EGT_ExhGas2_QckChgTFTKO > 116.59 [°C] < 840.00 [°C] ==FALSE	6.00 fail samples out of 8.00 over 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND			
					Dynamic check validity	==TRUE		
					AND			
					Temperature estimation not in fault	EGT_EGT2_DiagMdlFlt == FALSE		
					AND			
					Supply voltage in range	> 11.00[V]		
					AND			
					Minimum transition time elapsed after moving from combustion modes affecting the temperature estimation for a long period	>=150.00 [s]		
					AND			
					Minimum transition time elapsed after moving from combustion modes affecting the temperature estimation for a short period	>= 60.00 [s]		
					AND			
					Minimum time elapsed in engine running phase	>=120.00 [s]		
					AND			
					Limited modeled temperature changing rate, evaluated in a	<10.00 degC over		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					certain time window AND Fuel request and engine speed in range AND Minimum time elapsed once all other enabling conditions are met	CeEGTR_e_IndexMax50 00ms **EGT1 DynChk EngPtEnbl** > 8.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Low Reference Circuit	P1192	This diagnosis verifies Engine Out NOx Sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Low Reference pin (Ref)	open circuit on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Low Reference Circuit Low Voltage	P1193	This diagnosis verifies Engine Out NOx Sensor Low Reference Circuit for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Low Reference pin (Ref)	groundshort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 02 Low Reference Circuit High Voltage	P1194	This diagnosis verifies Engine Out NOx Sensor Low Reference Circuit for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Low Reference pin (Ref)	powershort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Performance - During Engine Running Test Bank 1 Sensor 3	P1196	This monitor has the purpose of warning the system/driverthat EGT 3 sensor behavior is not plausible, considering the signal value in dynamic conditions and comparing it with a modeled signal. Failure modes: sensor internal malfunctioning (offset or drift). The monitor compares the EGT signal read by the sensor with a modeled temperature signal. If the difference between the temperature values overcomes two calibratable thresholds (highest and lowest allowed difference), an error is detected.	The monitor compares EGT 3 signal read by the sensor with a modeled temperature signal. If the difference between the temperature values overcomes two calibratable thresholds, an error is detected.	>182.99 [°C] OR <-182.99 [°C]	Monitor enabled by dedicated calibration	1.00	6.00 fail samples out of 8.00 over 2.00 seconds	Type B, 2 Trips
					AND			
					Diagnostic system reset status	==FALSE		
					AND			
					Exhaust manifold pressure reliability flag	==TRUE		
					AND			
					No faults affecting EGT sensors	EGT_ExhGas3_StkFA AND EGT_ExhGas3_StkTFTK0 AND EGT_ExhGas3_CktFA AND EGT_ExhGas3_CktTFTK0 AND EGT_ExhGas3_QckChgFA AND EGT_ExhGas3_QckChgTFTKO		
					AND			
					Temperature estimation in range	> 142.99 [°C] < 815.00 [°C]		
					AND			
					Engine not running timer error flag	==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND			
					Dynamic check validity	==TRUE		
					AND			
					Temperature estimation not in fault	EGT_EGT3_DiagMdlFlt == FALSE		
					AND			
					Supply voltage in range	> 11.00[V]		
					AND			
					Minimum transition time elapsed after moving from combustion modes affecting the temperature estimation for a long period	>= 550.00 [s]		
					AND			
					Minimum transition time elapsed after moving from combustion modes affecting the temperature estimation for a short period	>= 260.00 [s]		
					AND			
					Minimum time elapsed in engine running phase	>=120.00 [s]		
					AND			
					Limited modeled temperature changing rate, evaluated in a certain time window	<5.00 degC over CeEGTR_e_IndexMax5000ms		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND Fuel request and engine speed in range AND Minimum time elapsed once all other enabling conditions are met	 **EGT3 DynChk EngPtEnbl** > 8.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit	P119A	This diagnosis verifies Engine Out NOx Sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 NOx-related measurement pin (M2)	open circuit on M2	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit Low Voltage	P119B	This diagnosis verifies Engine Out NOx Sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 NOx-related measurement pin (M2)	groundshort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Signal Circuit High Voltage	P119C	This diagnosis verifies Engine Out NOx Sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 1 NOx-related measurement pin (M2)	powershort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit	P119D	This diagnosis verifies Post Catalyst NOx Sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 NOx-related measurement pin (M2)	open circuit on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit Low Voltage	P119E	This diagnosis verifies Post Catalyst NOx Sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 NOx-related measurement pin (M2)	groundshort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Signal Circuit High Voltage	P119F	This diagnosis verifies Post Catalyst NOx Sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 NOx-related measurement pin (M2)	powershort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Reference Voltage Circuit	P11BE	This diagnosis verifies Post Catalyst NOx Sensor binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 02 Binary reference voltage (P+ pin)	open circuit on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:P30B5	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Reference Voltage Circuit Low Voltage	P11BF	This diagnosis verifies Post Catalyst NOx Sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 02 Binary reference voltage (P+ pin)	groundshort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Reference Voltage Circuit High Voltage	P11C0	This diagnosis verifies Post Catalyst NOx Sensor binary reference voltage pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 2 02 Binary reference voltage (P+ pin)	powershort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached P30B5No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Ground Circuit	P11C5	This diagnosis verifies Engine Out NOx Sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 1 heater reference pin (H-)	open circuit on H- pin	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range No DTC active:	 > 11.00 V TRUE FALSE > 9.80 V P30B4	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Ground Circuit High Voltage	P11C6	This diagnosis verifies Engine Out NOx Sensor heater ground circuit Short to Battery	Check if there is short circuit to power supply on NOx Sensor 1 heater reference pin (H-)	powershort on H-	Sensor Heater type is high side		Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Ground Circuit	P11C7	This diagnosis verifies Post Catalyst NOx Sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 2 heater reference pin (H-)	open circuit on H- pin	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range No DTC active:	 > 11.00 V TRUE FALSE > 9.80 V P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Ground Circuit High Voltage	P11C8	This diagnosis verifies Post Catalyst NOx Sensor heater ground circuit Short to Battery	Check if there is a short circuit to power on NOx Sensor 2 heater reference pin (H-)	powershort on H- pin	Sensor Heater type is high side		Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Signal Circuit	P11D0	This diagnosis verifies Post Catalyst NOx Sensor 02 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 02 Linear pin (P-)	open circuit on P-	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Signal Circuit Low Voltage	P11D1	This diagnosis verifies Post Catalyst NOx Sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 02 Linear pin (P-)	groundshort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Signal Circuit High Voltage	P11D2	This diagnosis verifies Post Catalyst NOx Sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 02 Linear Pin (P-)	powershort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 1	P11D3	This diagnosis verifies if Engine Out NOx Sensor raw signal is affected by an offset	Check if NOx1 signal has an offset by learning the raw value in stable conditions during fuel cut off maneuver. A fault is detected if one of the following conditions is true: 1. Mean of all NOx Sensor readings (where every reading is the mean value of a sampling window) OR 2. Mean of all NOx Sensor readings (where every reading is the mean value of a sampling window)	< -50.00 ppm > 180.00 ppm	Combustion mode dependent enabling flag Engine is running Engine is not cranking Powertrain relay voltage NOx Sensor Bus relay is commanded ON Engine Out NOx Sensor is present in the exhaust Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Sensor supply in range Sensor dewpoint is reached Injection small quantity adjustment (SQA) learning is not active EGR measured position Exhaust mass flow is within a range DEF injection is within a range	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE > 11.00 V TRUE TRUE < 0.0625 >-0.0625 > 10.00 sec > 9.80 V TRUE FAD_SQA_LrnET_Enbl ==FALSE < 100.00% < 80.00 g/s > 10.00 g/s < 500.00 mg/s > -1.00 mg/s	The monitor runs after fuel cut off maneuver, when air mass integral exceeds 20.00 g and Engine Out NOx signal is stable for at least 0.00s. The NOx value used for the monitor is calculated after sampling up to 10.00 sampling windows (each one made up of 10.00 samples), averaging the mean values of every window. Once computed this value, the diagnostic provides a result. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine speed is within a range	< 4,500.00 rpm > 800.00 rpm		
					Engine Out NOx Sensor temperature is within a range	< 410.00 °C > -20.00 °C		
					Fuel request is steady state when all the following conditions are verified: a) Fuel request derivative b) Fuel request within a range c) conditions a) and b) are fulfilled for a time	 < 0.01 mm^3/s < 0.00 mm^3 > -1.00 mm^3 > 3.00 s		
					Intake manifold absolute pressure	< 1,000.00 kPa		
					No failure on intake manifold absolute pressure Sensor	MAP_SensorFA==FALSE		
					No electrical failure on NOx1 Sensor	NOX_Snsr1_FltSt ==FALSE		
					No current control failure on NOx1 Sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No out of range low failure on NOx1 Sensor	NOX_NOx1_OutOfRngLo Fit ==FALSE		
					No out of range high failure on NOx1 Sensor	NOX_NOx1_OutOfRngHi Fit ==FALSE		
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No DTC active:	P30B4		
					No failure on EGR valve actuator	EGR_PstnShtOffReqFA ==FALSE		
					No failure on high pressure fuel rail system	FHPJnjLeakage ==FALSE		
					No failure on injectors	FUL_GenericlnjSysFlt ==FALSE		
					No fault on any exhaust mass flow model input	EXM_TurbFlowNotValid ==FALSE		
					No failure on air control system	AIC_AirShtOffReq ==FALSE		
					No failure on NOx Sensor Bus relay circuit	SBR_RlyFA==FALSE		
					No failure on Upstream SCR temperature Sensor	NOX_Snsr1_TempFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 2	P11D5	This diagnosis verifies if Post Catalyst NOx Sensor raw signal is affected by an offset	Check if NOx2 signal has an offset by learning the raw value in stable conditions during afterrun maneuver. The diagnosis result is the average value of a sampling window. The diagnosis result is processed with EWMA logic. A fault is detected if one of the following conditions is true: 1. EWMA filtered NOx raw average value OR 2. EWMA filtered NOx raw average value	 < -30 ppm > 250 ppm	No failure on upstream SCR temperature Sensor No failure on Vehicle Speed Sensor No failure on SCR system No failure on HC injector No failure on NOx Sensor Bus relay circuit No failure on downstream SCR HC model inputs No 02 plausibility in load fault on NOx2 No failure on NOx2 CAN communication No electrical failure on NOx2 Sensor No out of range low failure on NOx2 Sensor No out of range high failure on NOx2 Sensor No current control failure on NOx2 Sensor No DTC active:	EGT_TempSCR_UpFlt ==FALSE VehicleSpeedSensor_FA ==FALSE EXF_TotExhSCR_UpFlt ==FALSE HCI_GenericShtOffReq ==FALSE SBR_RlyFA ==FALSE SCR_HC_SCR_DwnFlt ==FALSE OXY_NOx2ChkLoadFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE N0X_Snsr2_FltSt ==FALSE NOX_NOx2_OutOfRngLoFit ==FALSE NOX_NOx2_OutOfRngHiFit ==FALSE N0X_N0x2_StBitChkFlt ==FALSE P30B5	The monitor runs in afterrun, at 150 s after keyoff, once NOx2 Self Test diagnostic has been completed. The NOx value used for the monitor is calculated by sampling up to 100 samples. Once computed this value, the diagnostic provides a result. Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 0 test per trip are allowed Task = 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Powertrain relay voltage	> 11.00V		
					Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	< 0.0625 >- 0.0625		
					b) condition a) is fulfilled for time	> 45 s		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					c) Sensor signal status is valid	TRUE		
					d) condition c) is fulfilled for time	> 5 s		
					Post Catalyst NOx Sensor is present in the exhaust	TRUE		
					Engine is not cranking	TRUE		
					e) combustion mode dependent enabling flag	**NOX_S2_OfstMntrEnblCmbMode**		
					f) condition e) is fulfilled for time	> 30 s		
					g) engine speed	> Orpm < 3,000 rpm		
					h) condition g) is fulfilled for time	> 1 s		
					i) After injection pulse is not used for time	> 0 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					j) upstream SCR temperature is in range	> 150°C < 400°C		
					k) exhaust mass flow is in range	> Og/s < 250 g/s		
					1)DEF injection is in range	>= Omg/s < 350mg/s		
					m) conditions j) k) 1) are fulfilled for time	> 30 s		
					n) duty cycle applied to the HC injector driver	< 100%		
					o) condition n) is fulfilled for time	> 0 s		
					p) time between key off and last regen event	> 300 s		
					q) deceleration before keyoff	< 2.50 m/s^2		
					r) condition q) could be ignored if idle vehicle condition s.x) is fulfilled			
					s.1) vehicle speed in idle range	< 5kph < 10kph		
					s.2) condition s.1) fulfilled for time	> 1 s		
					t) idle before keyoff for a time	< 450 s		
					u) Upstream SCR temperatures derivative in range	< 5 °C/s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					v) condition u) is fulfilled for a time	> Os		
					w) upstream SCR temperature derivative overcomes threshold	< 5 °C/s		
					x) condition w) has expired for a time	> 60s		
					timers of conditions v), x) are reset when condition w) is verified			
					y) time between keyoff and last DEF RDP event	> 60s		
					z) DEF system ready to inject	TRUE		
					A) In case of DEF Tank partially frozen or system in transient dosing, the following conditions is used, as well:			
					A1) alpha ratio	> 10.00		
					B) in case system comes out from condition A) during the driving cycle, then, time passed at key-off	>180s		
					Once all conditions above are fulfilled during the driving cycle, sensor raw signal average in a calibratable window is computed in afterrun when following conditions are fulfilled:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					C) stabilization timer to trigger execution D) NOx2 Self Diag execution has been completed	> 150 s TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Pump Current Control Circuit	P11D8	This diagnosis verifies Post Catalyst NOx Sensor 02 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 02 Reference pin (M1, auxiliary pumping current)	open circuit on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Pump Current Control Circuit Low Voltage	P11D9	This diagnosis verifies Post Catalyst NOx Sensor 02 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 02 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Pump Current Control Circuit High Voltage	P11DA	This diagnosis verifies Post Catalyst NOx Sensor 02 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 02 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Low Reference Circuit	P11FC	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Low Reference pin (Ref)	open circuit on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Low Reference Circuit Low Voltage	P11FD	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Low Reference pin (Ref)	groundshort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 02 Low Reference Circuit High Voltage	P11FE	This diagnosis verifies Post Catalyst NOx Sensor Low Reference Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Low Reference pin (Ref)	powershort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Supply Circuit	P122B	This monitor checks if the Throttle DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Control Circuit Shorted	P122C	This monitor checks if the Throttle commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 9 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]	Function task: 12.5 ms	
					H-Bridge driver is ON			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Position Sensor Exceeded Learning Limit (SENT position sensor)	P122D	This monitor checks if the Throttle position SENT sensor has an offset with respect to the nominal position where the valve does the learning procedure (fully closed)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold OR SENT position raw voltage when the valve is in wide open position < low threshold OR SENT position raw voltage when the valve is in wide open position > high threshold	< 87.80 [%5V] OR > 91.60[%5V] < 10.00 [%5V] OR > 30.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: - engine coolant temperature - no faults present on coolant temperature sensor - outside air temperature - no faults present on outside air temperature sensor - PT relay supply voltage No faults present on Throttle position sensor, Throttle valve, Throttle position deviation. End Of Trip event has elapsed	==1.00 >=30.00 [°C] <=150.00 [°C] ECT_Sensor_FA == FALSE >= -9.00 [°C] OAT_PtEstFiltFA == FALSE > 5.00 [V] TPS_PstnSnsrCktFlt== FALSE TPS_ActrFA == FALSE TPS_PstnDvtnFA == FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 Positive Voltage Control Circuit Shorted to Control Circuit	P1248	This DTC detects a shorted load on Injector 1	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderA and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Positive Voltage Control Circuit Shorted to Control Circuit	P1249	This DTC detects a shorted load on Injector 2	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderB and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderB	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 3 Positive Voltage Control Circuit Shorted to Control Circuit	P124A	This DTC detects a shorted load on Injector 3	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderH and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderH	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 4 Positive Voltage Control Circuit Shorted to Control Circuit	P124B	This DTC detects a shorted load on Injector 4	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderE and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 5 Positive Voltage Control Circuit Shorted to Control Circuit	P124C	This DTC detects a shorted load on Injector 5	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderF and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderF	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 6 Positive Voltage Control Circuit Shorted to Control Circuit	P124D	This DTC detects a shorted load on Injector 6	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	the time to reach the 2 A threshold of the injector current is shorter than 2 us	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and FUL_OutEnblCyl_CiEPSR_CylinderG and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderG	== 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] ==TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Signal Circuit	P1388	This diagnosis verifies Post Second Catalyst NOx Sensor NOx Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 3 NOx-related measurement pin (M2)	open circuit on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Signal Circuit Low Voltage	P1389	This diagnosis verifies Post Second Catalyst NOx Sensor NOx Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 3 NOx-related measurement pin (M2)	groundshort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Signal Circuit High Voltage	P138A	This diagnosis verifies Post Second Catalyst NOx Sensor NOx Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 3 NOx-related measurement pin (M2)	powershort on M2 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Supply Circuit	P1402	This monitor checks if the HP EGR DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Control Circuit Shorted	P1407	This monitor checks if the HP EGR commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON Diagnostic system enabled (no clear code or EOT in progress) HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Current Range/ Performance	P140F	This monitor checks if an excessive current flows through the HP EGR DC-Motor (e.g. shunt circuit between load, HP EGR DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					No faults present on HP EGR DC Motor current range/performance	EGR_MtrCurrLimTFTKO ==FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Supply Circuit	P1419	This monitor checks if the LP EGR DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Control Circuit Shorted	P141A	This monitor checks if the LP EGR commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	>8 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Current Range/ Performance	P141B	This monitor checks if an excessive current flows through the LP EGR DC-Motor (e.g. shunt circuit between load, LP EGR DC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					No faults present on LP EGR DC Motor current range/performance	LPE_MtrCurrLimTFTKO ==FALSE		
					H-Bridge driver is ON			
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation B Motor Overtemperature	P141C	This monitor checks if the temperature of the LP EGR DC-Motor increases too much (e.g. LP EGR DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Intake Air Flow Motor Overtempera tore	P1425	This monitor checks if the temperature of the Throttle DC-Motor increases too much (e.g. Throttle DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]	Function task: 12.5 ms	
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too Low	P144E	DPF Control Temperature Deviation diagnostic monitors the exhaust gas temperature downstream the 1st ccDOC (EGT2 sensor, configuration **"c1")** or upstream the DPF (EGT3 sensor, configuration **"c2")** to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too low temperature, that means a Positive temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring is divided into 2 logics, in particular the DPF warm up state logic and the DPF steady state logic.	**LowTemperature monitoring (Positive Deviation):** **(c1)** Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	>100.00 [degC]	Test enabled by calibration flag	1.00 [Boolean] ==TRUE	850.00 fail samples out of 1,000.00 samples Function task: 100ms	Type B, 2 Trips
					Regeneration state in warm up DPF Mode	DPF_DPF_St== WarmJJp		
					DPF temperature closed loop control shall be enabled	EGT_DsblCL== Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00[V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean] ==FALSE		
					No Fault on DOC downstream temperature sensor (only SCR forward architectures)	EGT_SnsrCatDwnFlt [Boolean] ==FALSE		
					No Fault on DPF upstream temperature model (only SCRF architectures)	EGTTempDPFJJpFIt [Boolean] ==FALSE		
					No Fault on DPF upstream temperature sensor (only DPF forward architectures)	EGT_SnsrDPF_UpFlt [Boolean] ==FALSE		
					No Fault on ambient temperature sensor (only SCR forward	OAT_PtEstFiltFA [Boolean] ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					architectures)			
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd [Boolean] ==FALSE AND AAP_AmbPresSnsrTFTK 0 [Boolean] ==FALSE		
					Combustion mode different from LNT Desox Lean and LNT Engine Protection	==TRUE		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF _TempDeviation** [Boolean]		
					Exhaust mass flow AND Exhaust mass flow	< 200.00 [g/s] > 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at	> 150.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					least a timer			
			Low Temperature monitoring (Positive Deviation):		Test enabled by calibration flag	1.00 [Boolean] ==TRUE	850.00 fail samples out of 1,000.00 samples Function task: 100ms	
			(c1) Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	>100.00 [degC]	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state		
					DPF temperature closed loop control shall be enabled	EGT_DsblCL == Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00[V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean] ==FALSE		
					No Fault on DOC downstream temperature sensor (only SCR forward architectures)	EGT_SnsrCatDwnFlt [Boolean] ==FALSE		
					No Fault on DPF upstream temperature model (only SCRF architectures)	EGTTempDPFJJpFIt [Boolean] ==FALSE		
					No Fault on DPF upstream temperature sensor (only DPF forward architectures)	EGT_SnsrDPF_UpFlt [Boolean] ==FALSE		
					No Fault on ambient	OAT_PtEstFiltFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					temperature sensor (only SCR forward architectures)	[Boolean] ==FALSE		
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd [Boolean] ==FALSE AND AAP_AmbPresSnsrTFTK 0 [Boolean] ==FALSE		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF _TempDeviation** [Boolean]		
					Exhaust mass flow AND Exhaust mass flow	< 200.00 [g/s] > 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					Time in which the system is in cut off	<= 30.00 [sec]		
					All the above enabling conditions are met for at least a timer	> 5.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop Particulate Filter Regeneration Control At Limit - Stage 2 Temperature Too High	P144F	DPF Control Temperature Deviation diagnostic monitors the exhaust gas temperature downstream the 1st ccDOC (EGT2 sensor, configuration **"c1")** or upstream the DPF (EGT3 sensor, configuration **"c2")** to determine whether the temperature deviation between the control setpoint and the temperature read by the sensor is within a prescribed deviation range. Temperature deviation diagnostic shall diagnose a too high temperature, that means a Negative temperature deviation temperature. The diagnosis runs during regeneration mode and when the temperature closed loop is active. The monitoring runs only in DPF steady state logic.	**Hi Temperature monitoring (Negative Deviation):**		Test shall be enabled by calibratable flag	1.00 [Boolean]	850.00 fail samples out of 1,000.00 samples	Type B, 2 Trips
			(c1) Temperature ccDOC Downstream control setpoint - ccDOC Downstream sensor reading (EGT2) **(c2)** Temperature DPF Upstream control setpoint - DPF Upstream sensor reading (EGT3)	< -200.00 [degC]	Regeneration state in Steday state DPF Mode	DPF_DPF_St== Steady state	Function task: 100ms	
					DPF temperature closed loop control shall be enabled	EGT_DsblCL== Enable temperature Closed loop control [Boolean]		
					Battery voltage	> 11.00[V]		
					No fault on exhaust mass flow	EXM_TurbFlowNotValid [Boolean]		
					No Fault on DOC downstream temperature sensor (only SCR forward architectures)	EGT_SnsrCatDwnFlt		
					No Fault on DPF upstream temperature model (only SCRF architectures)	EGTTempDPFJJpFIt [Boolean]		
					No Fault on DPF upstream temperature	EGT_SnsrDPF_UpFlt [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor (only DPF forward architectures)			
					No Fault on ambient temperature sensor (only SCR forward architectures)	OAT_PtEstFiltFA [Boolean]		
					No Fault on ambient pressure sensor (only SCR forward architectures)	AAP_AmbientAirPresDfltd AND AAP_AmbPresSnsrTFTK 0 [Boolean]		
					Temperature deviation monitoring shall be enabled by a boolean flag. The boolean flag shall be the output of a map function of engine speed and fuel request	**EnginePointEnable_DPF _TempDeviation** [Boolean]		
					Exhaust mass flow	< 200.00 [g/s]		
					AND Exhaust mass flow	> 8.00 [g/s]		
					Filtered Exhaust mass flow variation (absolute value)	< 100.00 [g/s]		
					Time in which the system	<= 30.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					is in cut off			
					All the above enabling conditions are met for at least a timer	> 5.00 [sec]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Electrode Supply Circuit Open	P1474	This diagnosis detects an open circuit on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electode supply voltage signal (i.e. measured ADC voltage for electrode current)	< 0.3 V	Soot Sensor Control Unit conditions: Battery Voltage Soot Sensor Electrode Supply Voltage ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 9 V = 45,6V > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24DO)	Time counter: 21.00 consecutive failures OR 40.00 failures out of 80.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Electrode Supply Circuit Low	P1475	This diagnosis detects a short to ground on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage	 U < 41.55 V OR U > 49.72 V	Soot Sensor Control Unit conditions: Battery voltage Soot Sensor Electrode High Voltage Enabled ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	 > 9 V > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24DO)	Time counter: 22.00 consecutive failures OR 42.00 failures out of 84.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Electrode Supply Circuit High	P1476	This diagnosis detects a short to power on the soot sensor electrode supply line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode voltage signal (measured ADC voltage for electrode current)	>4.7 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage Disabled ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24DO)	Time counter: 6.00 consecutive failures OR 15.00 failures out of 20.00 samples 100 ms/sample	Type B, 2 Trips
			Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage	>2 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage Disabled ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor	 NOT(SBR_RlyFA) NOT(U02A3)	Time counter: 6.00 consecutive failures OR 15.00 failures out of 20.00 samples 100 ms/sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(P24DO)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Shunt Circuit High Current	P147B	This diagnosis detects a no more efficient soot sensor	Soot Sensor Electrode raw current	> 6.70A	Key is turned on		No time debouce	Type B, 2 Trips
					Ignition voltage in range	> 11.00		
					Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					No electrical fault detected on Soot Sensor	NOT(SOT_ElecIFlt)		
					Soot Sensor is in measurement phase			
					Soot Sensor Electrode supply voltage	41.00 V < U < 50.00 V		
					Soot Sensor temperature	200.00 °C < T < 425.00 °C		
					Soot Sensor Electrode current measurement enabled			
					Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Reference Voltage Circuit	P14A7	This diagnosis verifies Post Second Catalyst NOx Sensor binary reference voltage pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 3 02 Binary reference voltage (P+ pin)	open circuit on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:P30B5	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Reference Voltage Circuit Low Voltage	P14A8	This diagnosis verifies Post Second Catalyst NOx Sensor binary reference voltage pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 3 02 Binary reference voltage (P+ pin)	groundshort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Reference Voltage Circuit High Voltage	P14A9	This diagnosis verifies Post Second Catalyst NOx Sensor binary reference voltage pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 3 02 Binary reference voltage (P+ pin)	powershort on P+ pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached P30B5No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Signal Circuit	P14AA	This diagnosis verifies Post Second Catalyst NOx Sensor 02 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 3 02 Linear pin (P-)	open circuit on P-	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Signal Circuit Low Voltage	P14AB	This diagnosis verifies Post Second Catalyst NOx Sensor linear lambda circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 3 02 Linear pin (P-)	groundshort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Signal Circuit High Voltage	P14AC	This diagnosis verifies Post Second Catalyst NOx Sensor linear lambda circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 3 02 Linear Pin (P-)	powershort on P- pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 O2 Pump Current Control Circuit	P14AD	This diagnosis verifies Post Second Catalyst NOx Sensor O2 reference circuit pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 3 O2 Reference pin (M1, auxiliary pumping current)	open circuit on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Pump Current Control Circuit Low Voltage	P14AE	This diagnosis verifies Post Second Catalyst NOx Sensor 02 reference circuit pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 3 02 Reference pin (M1, auxiliary pumping current)	groundshort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Pump Current Control Circuit High Voltage	P14AF	This diagnosis verifies Post Second Catalyst NOx Sensor 02 reference circuit pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 3 02 Reference pin (M1, auxiliary pumping current)	powershort on M1 pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Low Reference Circuit	P14B0	This diagnosis verifies Post Second Catalyst NOx Sensor Low Reference Circuit for Open Load Circuit	Check if there is an open circuit on NOx Sensor 3 Low Reference pin (Ref)	open circuit on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Low Reference Circuit Low Voltage	P14B1	This diagnosis verifies Post Second Catalyst NOx Sensor Low Reference Circuit for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 3 Low Reference pin (Ref)	groundshort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 02 Low Reference Circuit High Voltage	P14B2	This diagnosis verifies Post Second Catalyst NOx Sensor Low Reference Circuit for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 3 Low Reference pin (Ref)	powershort on Ref pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Heater Ground Circuit	P14B3	This diagnosis verifies Post Second Catalyst NOx Sensor heater ground circuit open	Check if there is an open circuit on NOx Sensor 3 heater reference pin (H-)	open circuit on H- pin	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range No DTC active:	 > 11.00 V TRUE FALSE > 9.80 V P30D5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Heater Ground Circuit High Voltage	P14B4	This diagnosis verifies Post Second Catalyst NOx Sensor heater ground circuit Short to Battery	Check if there is a short circuit to power on NOx Sensor 3 heater reference pin (H-)	powershort on H- pin	Sensor Heater type is high side Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	 > 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Offset Learning At Min Limit - Bank 1 Sensor 3	P14D9	This diagnosis verifies if Post Second Catalyst NOx Sensor raw signal is affected by an offset	Check if NOx3 signal has an offset by learning the raw value in stable conditions during afterrun maneuver. The diagnosis result is the average value of a sampling window. The diagnosis result is processed with EWMA logic. A fault is detected if one of the following conditions is true: 1. EWMA filtered NOx raw average value OR 2. EWMA filtered NOx raw average value	< -30 ppm > 180 ppm	No failure on upstream SCR3 temperature Sensor No failure on Vehicle Speed Sensor No failure on SCR system No failure on HC injector No failure on NOx Sensor Bus relay circuit No failure on downstream SCR HC model inputs No 02 plausibility in load fault on NOx3 No failure on NOx3 CAN communication No electrical failure on NOx3 Sensor No out of range low failure on NOx3 Sensor No out of range high failure on NOx3 Sensor No current control failure on NOx3 Sensor No DTC active:	EGT_TempSCR2_UpFlt ==FALSE VehicleSpeedSensor_FA ==FALSE EXF_TotExhSCR_UpFlt ==FALSE HCI_GenericShtOffReq ==FALSE SBR_RlyFA==FALSE SCR_HC_SCR_DwnFlt ==FALSE OXY_NOx3ChkLoadFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_C ==FALSE N0X_Snsr3_FltSt ==FALSE NOX_NOx3_OutOfRngLoFit ==FALSE NOX_NOx3_OutOfRngHiFit ==FALSE N0X_N0x3_StBitChkFlt ==FALSE P30D5	The monitor runs in afterrun, at 150 s after keyoff, once NOx3 Self Test diagnostic has been completed. The NOx value used for the monitor is calculated by sampling up to 100 samples. Once computed this value, the diagnostic provides a result. Test per trip: 1 If Fast Initial Response EWMA is active then 1 test per trip are allowed If Rapid Response EWMA is active then 1 test per trip are allowed Task = 25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Powertrain relay voltage	> 11.00V		
					Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	< 0.0625 >- 0.0625		
					b) condition a) is fulfilled for time	> 45 s		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					c) Sensor signal status is valid	TRUE		
					d) condition c) is fulfilled for time	> 5 s		
					Post Second Catalyst NOx Sensor is present in the exhaust	TRUE		
					Engine is not cranking	TRUE		
					e) combustion mode dependent enabling flag	**NOX_S3_OfstMntrEnblCmbMode**		
					f) condition e) is fulfilled for time	> 30 s		
					g) engine speed	> Orpm < 3,000 rpm		
					h) condition g) is fulfilled for time	> 1 s		
					i) After injection pulse is	> 0 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					not used for time			
					j) upstream SCR2 temperature is in range	> 150°C < 400°C		
					k) exhaust mass flow is in range	> Og/s < 250 g/s		
					l) DEF injection is in range	>= Omg/s < 350mg/s		
					m) conditions j) k) 1) are fulfilled for time	> 30 s		
					n) duty cycle applied to the HC injector driver	< 100%		
					o) condition n) is fulfilled for time	> 0 s		
					p) time between key off and last regen event	> 300 s		
					q) deceleration before keyoff	< 2.50 m/s^2		
					r) condition q) could be ignored if idle vehicle condition s.x) is fulfilled			
					s.1) vehicle speed in idle range	< 5kph < 10kph		
					s.2) condition s.1) fulfilled for time	> 1 s		
					t) idle before keyoff for a time	< 450 s		
					u) Upstream SCR2 temperatures derivative in range	< 5 °C/s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					v) condition u) is fulfilled for a time	> Os		
					w) upstream SCR2 temperature derivative overcomes threshold	< 5 °C/s		
					x) condition w) has expired for a time	> 90s		
					timers of conditions v), x) are reset when condition w) is verified			
					y) time between keyoff and last DEF RDP event	> 60s		
					z) DEF system ready to inject	TRUE		
					A) In case of DEF Tank partially frozen or system in transient dosing, the following conditions is used, as well:			
					A1) alpha ratio	> 10.00		
					B) in case system comes out from condition A) during the driving cycle, then, time passed at key-off	>180s		
					Once all conditions above are fulfilled during the driving cycle, sensor raw signal average in a calibratable window is computed in afterrun when following conditions			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					are fulfilled: C) stabilization timer to trigger execution D) NOx3 Self Diag execution has been completed	 > 150s TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Glow Plug Positive Voltage Circuit	P161E	This DTC checks the circuit for electrical integrity during operation. Glow plugs supply pin open circuit or shorted to ground.	Voltage feedback under a calibratable threshold	Voltage_feedback < 6.00	Test enabled by calibration; Key on and engine running (cranking excluded); Battery voltage in range; Enable_On interface is true; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; VeGLOO_b_GlowPlugEnbld = TRUE; VeDRER_DiagSystemDsbl = FALSE;	5.00 fail samples over 10.00 samples Time task: 100 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger VGT A Control Circuit Shorted (Single and Two stage VGT DC Motor)	P169F	This monitor checks if the VGT commands are shorted one other	Current flowing through the H-Bridge switches higher than a threshold (error information provided by HWIO)	> 8 [A]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range H-Bridge driver is ON HWIO error status different from INDETERMINATE status	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger VGT A Current Range/ Performance (Single and Two stage VGT DC Motor)	P16FA	This monitor checks if an excessive current flows through the VGT DC-Motor (e.g. shunt circuit between load, VGTDC-Motor internal faults, etc).	Current flowing through the H-Bridge higher than a threshold (error information provided by HWIO)	> 6.3 [A]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					H-Bridge driver is ON			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Efficiency Below Threshold Bank 1 - (EWMA filter used)	P2002	This diagnosis detects a cracked Diesel Particulate Filter	{The predicted soot sensor filtered by using EWMA filter is} OR {The predicted soot sensor filtered by using EWMA filter is AND - DPF Efficiency Below Threshold Bank 1 previously detected (TRUE -> fault active) }	<0.80 < 0.80 DPF_DPF_EffMontrFA ===TRUE	Test enabled by calibration Ignition voltage in range for a time Engine running or engine cranking or in auto-stop phase No faults on soot sensor and faults which inhibit sensor to stay in measurement Engine out soot model realiable Note: the not reliability shall be verified for 1 s before to be declared No faults on downstream DPF temperature sensor or model No faults on downstream DPF mass airflow No faults on engine out soot model Ambient temperature	1.00 ==TRUE > 0.00 [s] ==TRUE SOT_SootSnsrFlt ==FALSE EXM_PM_TurbFlowNotRIb ==FALSE SOT_ExhTempSootSnsrVId ==TRUE SOT_TotExhSootSnsrVId ==TRUE SOT_PM_DPF_UpFlt ==FALSE > -20.00 [°C]	Test per Trip: 1. If Fast Initial Response (FIR) mode is active then 2.00 tests per trip are allowed. If Rapid Response (RR) mode is active then 2.00 tests per trip are allowed. The signal for the monitor check is filtered by means of a first-order filter. The filter step change can assume the following values: - 0.90 if FIR is active - 0.09 if RR is active - 0.04 if neither FIR nor RR are active. Initial filter value: - 0.80 when FIR is activated -0.84 when RR is activated	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					During sensor measurement phase, Number of Autostop events	< 20.00 [Cnt]		
					During sensor measurement phase, Duration of Autostop phase	< 200.00 [s]		
					During sensor measurement phase, no heavy transient manoeuvers detected , i.e. the maximum fuel request during a transient manoeuver is	<=1,000.00 [mm^3]		
					EWMA filter is enabled AND number of diagnostic run for driving cycle is	1.00 ==TRUE < 1 (when FIR and RR are not active) <1.00 (when FIR is active) < 1.00 (when RR is active)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Control Stuck Closed (Swirl DC Motor)	P2006	This monitor detects the Swirl flaps mechanically stuck in a certain position different from their defaulted position (fully open) when the actuator is no longer driven (missing defaulted position)	Position after P20F8 has set > threshold	> 50.00 [%]	P0046 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) Swirl position closed loop control active (no faults present on Swirl position sensor, Swirl vanes)	 >2.00[s] SWC_PstnSnsrFA ==FALSE SWC_ActrFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Control Control Circuit (Swirl DC Motor)	P2008	This monitor checks if the DC-Motor Swirl commands are in open circuit	Load resistance higher than a threshold (error information provided by HWIO)	> 200 [kOhm]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type B, 2 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					H-Bridge driver is OFF			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Performance (Swirl DC Motor)	P200A	This monitor checks if the Swirl position SENT sensor has an offset with respect to the nominal positions where the flaps do the learning procedure (fully closed and/or fully open) and if the valve is not excessively slow	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold OR SENT position raw voltage when the valve is in wide open position < low threshold OR SENT position raw voltage when the valve is in wide open position > high threshold	<6.00 [%5V] OR >16.50 [%5V] OR <84.25 [%5V] OR >91.33 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: - engine coolant temperature - no faults present on coolant temperature sensor - outside air temperature - no faults present on outside air temperature sensor - PT relay supply voltage No faults present on Swirl position sensor, Swirl valve, Swirl position deviation. End Of Trip event has elapsed	==1.00 >=30.00 [°C] <=150.00 [°C] ECT_Sensor_FA ==FALSE >= -40.00 [°C] OAT_PtEstFiltFA ==FALSE >=9.50 [V] SWC_PstnSnsrFA ==FALSE SWC_ActrFA==FALSE SWC_PstnDvtnFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			response time in closing direction > high threshold OR response time in opening direction > high threshold OR total time needed to complete either closing or opening phase of the slow response test >= high threshold	>0.50 [s] OR > 0.50 [s] > 10.00 [s]	Test enabled by calibration Key signal is off Slow response procedure at key off in fully closed and/or wide open positions have been successfully completed: - engine coolant temperature - no faults present on coolant temperature sensor - outside air temperature - no faults present on outside air temperature sensor - PT relay supply voltage No faults present on Swirl position sensor, Swirl valve, Swirl position deviation. End Of Trip event has elapsed	== 1.00 >=30.00 [°C] <=150.00 [°C] ECT_Sensor_FA ==FALSE >= -40.00 [°C] OAT_PtEstFiltFA ==FALSE >=9.50 [V] SWC_PstnSnsrFA ==FALSE SWC_ActrFA==FALSE SWC_PstnDvtnFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Over Temperature Bank (DOC_UI_S DPF_uSCR_ ROC)(EGT3)	P200C	This diagnosis verify if the exahust gas temperature on DPF Downstream (EGT_DPF_Dwn) is above its maximum allowed temperature	**Excursion Event monitoring:** DPF Downstream Exhaust gas temperature	***In Regeneration mode:*** >850.00 [°C] **In Normal mode:** > 850.00 [°C]	Test enabled by calibration (TRUE—> enable FALSE -> disable) and with Battery voltage and with Engine running and with No fault on DPF Downstream Temperature sensor	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean] EGT_SnsrDPF_DwnFlt [Boolean]	**In Normal mode:** 300.00 fail samples out of 450.00 samples **In Regeneration mode:** 300.00 fail samples out of 450.00 samples Function task: 100ms	Type A, 1 Trips
			Extreme Event monitoring: DPF Downstream Exhaust gas temperature	> 950.00 [°C]	Test enabled by calibration (TRUE-> enable FALSE -> disable) and with Battery voltage and with Engine running and with	1.00 [Boolean] > 11.00 [V] == TRUE [Boolean]	50.00 fail samples out of 70.00 samples Function task: 100ms	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No fault on DPF Downstream Temperature sensor	EGT_SnsrDPF_DwnFlt [Boolean]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Position Sensor Circuit Low (SENT position sensor)	P2016	This monitor checks if the Swirl SENT position sensor is out of electrical range low	SENT position raw voltage < low threshold	<1.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Swirl SENT communication	==1.00 >11.00 [V] SWC_SENT_LossCommFit ==FALSE	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Position Sensor Circuit High (SENT position sensor)	P2017	This monitor checks if the Swirl SENT position sensor is out of electrical range high	SENT position raw voltage > high threshold	<99.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on Swirl SENT communication	==1.00 >11.00 [V] SWC_SENT_LossCommFit ==FALSE	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Control Supply Voltage Low (Swirl DC Motor)	P201B	This monitor checks if the Swirl DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range HWIO error status different from INDETERMINATE status	==1.00 > 11.00 [V]	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring Low	P2032	This monitor has the purpose of warning the system/driver that an electrical problem on EGT 2 sensor is present. Failure mode: Out Of Range Low (short circuit to ground) The monitor compares the EGT raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected.	The monitor compares the EGT 2 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected.	<40.00 [Ohm]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status	1 [Boolean] == FALSE == TRUE == TRUE == FALSE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 out of range monitoring High	P2033	This monitor has the purpose of warning the system/driver that an electrical problem on EGT 2 sensor is present. Failure modes: Out Of Range High (open circuit, short circuit to supply, broken wiring) The monitor compares the EGT raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected.	The monitor compares the EGT 2 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected.	>400,000.00 [Ohm]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status	1 [Boolean] == FALSE == TRUE == TRUE == FALSE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 stuck in range monitoring	P2080	This monitor has the purpose of warning the system/driver that EGT 1 sensor behavior is not plausible in a way that the signal coming from the sensor is stuck when expected to change. Failure modes:sensor internal malfunctions (stuck output) The difference between the maximum EGT value and the EGT sensor signal (converted raw signal) is lower than an expected temperature variation for a certain observation time, once a minimum amount of fuel has been injected. The following parameters are evaluated starting from the read converted raw temperature value, through calibratable maps: - Observation time window - Expected temperature variation - Minimum amount of injected fuel	The difference between maximum EGT 1 value and EGT 1 sensor signal is lower than an expected temperature variation for a certain observation time, once a minimum amount of fuel has been injected.	**EGT1 Stuck Temperature <=Variation** [°C] **EGT1 Stuck Wait >Time** [s] **EGT1 Fuel request integral**	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine running AND No faults on EGT1 sensor (electrical and plausibility in and logic) AND Minimum elapsed time in engine-off phase AND Engine not running error flag AND	1 [Boolean] ==FALSE == TRUE EGT_ExhGas1_CktTFTK0 AND EGT_ExhGas1_CktFA AND EGT_ExhGas1_RatTFTK0 AND EGT_ExhGas1_RatFA AND EGT_ExhGas1_QckChgFA AND EGT_ExhGas1_QckChgTFTKO >10,800 [s] ==FALSE	No debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Supply voltage in range	>11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 1 quick change monitoring	P2081	This function has the purpose of warning the system/driver that EGT 1 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues The monitor compares EGT 1 sensor signal (converted raw value) with two calibratable thresholds (minimum and maximum ones). Thresholds are dynamically evaluated by the SW.	The monitor compares EGT 1 sensor signal with two calibratable thresholds.Thresholds are dynamically evaluated by the SW as: 1) Maximum value between the last valid EGT temperature value + resolution error and a value obtained considering maximum calibratable value that can be read by the sensor, last valid EGT temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant 2) Minimum value between the last valid EGT temperature value - resolution error and a value obtained considering minimum calibratable value that can be read by the sensor, last valid EGT temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant	**EGT ExhGasI > QckChgMaxThrsh[°C]** **EGT ExhGasI < QckChgMinThrsh[°C]**	Monitor enabled by dedicated calibration AND Ignition run crank active AND Engine cranking AND Supply voltage in range AND No electrical faults affecting the sensor AND Punctual electrical errors affecting the sensor	1 [Boolean] ==TRUE ==FALSE > 11.00 [V] EGT_ExhGas1_CktFA AND EGT_ExhGas1_CktTFTK0 ==FALSE	20 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 stuck in range monitoring	P2084	This monitor has the purpose of warning the system/driver that EGT 2 sensor behavior is not plausible in a way that the signal coming from the sensor is stuck when expected to change. Failure modes:sensor internal malfunctions (stuck output) The difference between the maximum EGT value and the EGT sensor signal (converted raw signal) is lower than an expected temperature variation for a certain observation time, once a minimum amount of fuel has been injected. The following parameters are evaluated starting from the read converted raw temperature value, through calibratable maps: - Observation time window - Expected temperature variation - Minimum amount of injected fuel	The difference between maximum EGT 2 value and EGT 2 sensor signal is lower than an expected temperature variation for a certain observation time, once a minimum amount of fuel has been injected.	**EGT2 Stuck Temperature <=Variation** [°C] **EGT2 Stuck Wait >Time** [s] **EGT2 Fuel request integral**	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine running AND No faults on EGT2 sensor (electrical and plausibility in and logic) AND Minimum elapsed time in engine-off phase AND Engine not running error flag AND	1 [Boolean] ==FALSE == TRUE EGT_ExhGas2_CktTFTK0 AND EGT_ExhGas2_CktFA AND EGT_ExhGas2_RatTFTK0 AND EGT_ExhGas2_RatFA AND EGT_ExhGas2_QckChgFA AND EGT_ExhGas2_QckChgTFTKO >10,800 [s] ==FALSE	No debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Supply voltage in range	>11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 2 quick change monitoring	P2085	This function has the purpose of warning the system/driver that EGT 2 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues The monitor compares EGT 2 sensor signal (converted raw value) with two calibratable thresholds (minimum and maximum ones). Thresholds are dynamically evaluated by the SW.	The monitor compares EGT 2 sensor signal with two calibratable thresholds.Thresholds are dynamically evaluated by the SW as: 1) Maximum value between the last valid EGT temperature value + resolution error and a value obtained considering maximum calibratable value that can be read by the sensor, last valid EGT temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant 2) Minimum value between the last valid EGT temperature value - resolution error and a value obtained considering minimum calibratable value that can be read by the sensor, last valid EGT temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant	**EGT ExhGas2 > QckChgMaxThrsh[°C]** **EGT ExhGas2 < QckChgMinThrsh[°C]**	Monitor enabled by dedicated calibration AND Ignition run crank active AND Engine cranking AND Supply voltage in range AND No electrical faults affecting the sensor AND Punctual electrical errors affecting the sensor	1 [Boolean] ==TRUE ==FALSE > 11.00 [V] EGT_ExhGas2_CktFA AND EGT_ExhGas2_CktTFTK0 ==FALSE	20 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Manifold Runner Control Circuit Performance (Swirl DC Motor)	P20F8	This monitor detects an obstruction on the actuator (obstruction found during the flaps opening or closing) checking the setpoint position against the position measured by the Swirl Position Sensor	Absolute value of position tracking error (setpoint position - measured position)	>10.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Swirl position closed loop control active (no faults present on Swirl position sensor, Swirl vanes, Swirl position control deviation) Swirl position setpoint in steady state conditions for minimum time Engine coolant temperature higher or equal to minimum threshold OR Engine cooling system target temperature reached (thermostat opening) No faults present on engine coolant temperature sensor Outside air temperature higher or equal to minimum threshold No faults present on outside airtemperature	== 1.00 > 11.00 [V] SWC_PstnSnsrFA ==FALSE SWC_ActrFA==FALSE SWC_PstnDvtnFA ==FALSE >-100.00 [%/s] <100.00 [%/s] for >=0.50 [s] >= 30.00 [°C] ECT_Sensor_FA ==FALSE >= -20.00 [°C] OAT_PtEstFiltFA ==FALSE	960.00 fail counts out of 1,200.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor No mechanical stop soft approach in progress No anti-sticking procedure in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 1 Low Voltage	P2147	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage high across High Side Driver of bank 1 (injector 1 and 4) during On state indicates short to ground	impedence between HS pin of injector 1 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderA OR FUL_OutEnblCyl_CiEPSR CylinderE) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 1 High Voltage	P2148	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 1 (injector 1 and 4)	Voltage low across High side drive of bank 1 (injector 1 and 4) during off state indicates short to power	impedence between HS pin of injector 1 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 4 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderA OR FUL_OutEnblCyl_CiEPSR CylinderE) and (FUL_FuelInjectedCyl_CiEPSR_CylinderA OR FUL_FuelInjectedCyl_CiEPSR CylinderE)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 2 Low Voltage	P2150	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage high across High Side Driver of bank 2 (injector 2 and 5) during On state indicates short to ground	impedence between HS pin of injector 2 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderB OR FUL_OutEnblCyl_CiEPSR CylinderF) and (FUL_FuelInjectedCyl_CiEPSR_CylinderB OR FUL_FuelInjectedCyl_CiEPSR CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 2 High Voltage	P2151	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 2 (injector 2 and 5)	Voltage low across High side drive of bank 2 (injector 2 and 5) during off state indicates short to power	impedence between HS pin of injector 2 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 5 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderB OR FUL_OutEnblCyl_CiEPSR CylinderF) and (FUL_FuelInjectedCyl_CiEPSR_CylinderB OR FUL_FuelInjectedCyl_CiEPSR CylinderF)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 3 Low Voltage	P2153	This DTC detects a short circuit to ground of the high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage high across High Side Driver of bank 3 (injector 6 and 7) during On state indicates short to ground	impedence between HS pin of injector 6 and controller ground <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller ground <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderG OR FUL_OutEnblCyl_CiEPSR CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Positive Voltage Control Circuit Group 3 High Voltage	P2154	This DTC detects a short circuit to high voltage of high side driver circuit of the Bank 3 (injector 6 and 7)	Voltage low across High side drive of bank 3 (injector 6 and 7) during off state indicates short to power	impedence between HS pin of injector 6 and controller power <= 0.5 [Ohm] OR impedence between HS pin of injector 7 and controller power <= 0.5 [Ohm]	Test enabled by calibration; and Battery voltage and Key ON and Engine is not cranking and Engine Running and (FUL_OutEnblCyl_CiEPSR CylinderG OR FUL_OutEnblCyl_CiEPSR CylinderC) and (FUL_FuelInjectedCyl_CiEPSR_CylinderG OR FUL_FuelInjectedCyl_CiEPSR CylinderC)	= 1 [Boolean] > 11.00 [V] - - >= 1.00 [s] == 0 [Boolean] == 0 [Boolean] == TRUE); == TRUE);	4 failures out of 8 samples 100 ms/sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2201	This diagnosis verifies that Engine Out NOx Sensor embedded current control circuit status is healthy	Check if the NOx1 Sensor embedded stability criteria of Nox/Lambda current control circuit are violated	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its setpoint b) Delta Ip2 <426nA/10msec c) Delta Ip1 < 2.34 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Delta IpO < 300 uA/10 msec b) Delta Ip1 < 2.34 uA around its set point	Powertrain relay voltage	> 11.00 V	NOx stability flag time counter: 2 fails out of 2 samples Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.80 V		
					Engine is not cranking	TRUE		
					Sensor dewpoint is reached	TRUE		
					Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time	<0.0625 >- 0.0625 > 10.00 sec		
			NOx stability flag: (OFF_Time/TOTAL_time)	> 0.50 %	Engine is running	TRUE		
			Lambda stability flag: (OFF_Time/TOTAL_time)	> 0.50 %	No electrical failure on NOx1 Sensor	NOX_Snsr1_FltSt ==FALSE		
			Note: TOTAL_time= ON_time +OFF_Time		Combustion mode dependent enabling flag	**NOX_S1_StBitChkEnblCmbMode**		
					Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	<= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Low Bank 1 Sensor 1	P2202	This diagnosis verifies Engine Out NOx sensor read out of range low	Check if the NOx1 sensor NOx concentration raw read is out of lower range:		Fuel injection quantity request	>-1 mm^3	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
			NOx raw read	<-90 ppm				
					NOx Sensor Bus relay is commanded ON	TRUE		
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No current control failure on NOx1 sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No electrical failure on NOx1 sensor	NOX_Snsr1_FltSt ==FALSE		
					Combustion mode dependent enabling flag	**NOX_S1_OutRngMinCmbMode**		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit High Bank 1 Sensor 1	P2203	This diagnosis verifies Engine Out NOx Sensor read out of range high	Check if the NOx1 Sensor NOx concentration raw read is out of higher range:		Powertrain relay voltage	> 11.00 V	Time counter: 120 fails out of 240 samples	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
			NOx raw read	>2,990 ppm	No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A	Task=25ms	
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No current control failure on NOx1 Sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No electrical failure on NOx1 Sensor	NOX_Snsr1_FltSt ==FALSE		
					Combustion mode dependent enabling flag	**NOX_S1_OutRngMaxCmbMode**		
					Engine running for a time longer than	0.00 s		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit	P2205	This diagnosis verifies Engine Out NOx Sensor Heater Control pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Control pin	open circuit on Heater Control pin	Powertrain relay voltage	> 11.00 V	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.80 V		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit Low Voltage	P2206	This diagnosis verifies Engine Out NOx Sensor Heater Control pin for Short to Ground	Check if there is an short circuit to ground on NOx Sensor 1 Heater Control pin	groundshort on Heater Control pin	Powertrain relay voltage	> 11.00 V	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Control Circuit High Voltage	P2207	This diagnosis verifies Engine Out NOx Sensor Heater Supply pin for Short to Battery	Check if there is an short circuit to power supply on NOx Sensor 1 Heater Control pin	powershort on Heater Control pin	Powertrain relay voltage	> 11.00 V	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit	P2208	This diagnosis verifies Engine Out NOx Sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 1 Heater Sense pin (HTemp)	open circuit on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range No DTC active:	> 11.00 V TRUE FALSE > 9.80 V P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 1	P2209	This diagnosis verifies if the Engine Out NOx Sensor Heater raw resistance is in range	This diagnosis verifies if the Engine Out NOx Sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	>0.0625 <- 0.0625	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_A NOx Sensor Bus relay is commanded ON Delay timer once sensor supply is in range (> 10.8 V) Delay timer once sensor dewpoint is reached Delay timer once engine is overrun Delay timer once DPF combustion mode is not active No DTC active:	> 11.00 V FALSE TRUE >45 sec > 180 sec >5 sec 30 sec P30B4	Time counter: 125 fails out of 250 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 1	P220A	This diagnosis verifies if the supply voltage of the Engine Out Nox Sensor is out of range	Check if NOx Sensor 1 supply voltage status is out of range	Sensor supply voltage <9.80 V	Engine is running	TRUE	Time counter: 125 fails out of 250 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx Sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	> Osec		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					No DTC active:	P30B4		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 2	P220B	This diagnosis verifies if the supply voltage of the Post Catalyst NOx Sensor is out of range	Check if NOxSensor 2 supply voltage status is out of range	Sensor supply voltage < 9.80 V	Engine is running	TRUE	Time counter: 125 fails out of 250 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx Sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	> Osec		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit Low Voltage	P2210	This diagnosis verifies Engine Out NOx Sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 1 Heater Sense pin (HTemp)	groundshort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 1 Heater Sense Circuit High Voltage	P2211	This diagnosis verifies Engine Out NOx Sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply NOx Sensor 1 Heater Sense pin (HTemp)	powershort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B4	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Filter Deteriorated/ Missing Substrate Bank 1	P226D	Low Flow Resistance monitoring detects a Diesel Particulate Filter removed or broken or a Diesel Particulate Filer pressure sensor pipe disconnected, clogged, or blocked	Filtered Flow resistance (DPF_ResistFlowFltd)	< **Flow Resistance Too Low Threshold** [kPa/(l/s)]	Test enabled by calibration	1.00 ==TRUE	75.00 failures over 150.00 samples Function task: 100 ms	Type A, 1 Trips
					No fault on DPF pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrFlt ==FALSE		
					No fault on upstream DPF temperature estimated (model)	EGT_TempDPF_UpFlt ==FALSE		
					No fault on air flow meter	MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE		
					No fault on atmospheric pressure sensor	AmbPresDfltdStatus = CeAAPR_e_AmbPresNot Dfltd		
					DPF status in soot loading phase (no regeneration ongoing)	DPF_DPF_St == CeDPFR_e_SootLoading		
					Engine speed	> 500.00 [rpm]		
					No fault on exhaust mass flow estimation	EXF_TotExhDPF_UpFA ==FALSE		
					Exhaust gas volume flow greater than a	>78.00 [l/s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					calibrateable threshold for more than a calibratable time	for> 5.00 [s]		
					Soot trapped in the DPF	>-1.00 [Pct] AND <400.00 [Pct]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	> 200.00 [DegC] AND < 700.00 [DegC] for >45.00 [s]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> -256.00 [DegC] ==TRUE		
					Ambient Temperature	> -20.00 [DegC]		
					Correction of CCB model	<100.00 [%]		
					The fuel request is between two thresholds for a minimum calibrateable time	> **Lo_FR_MontrEnblLoThrsh** [mm^3] AND < **Lo_FR_MontrEnblHiThrsh** [mm^3] for > 0.00 [		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Pipe Icing Risk Low	==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Out of Range During Deceleration Bank 1 Sensor 1	P2297	This DTC aims to detect a drift of measured 02 value (A) from an estimated concentration (B) when the latter can be considered stable during overrun condition.	(A - B) in overrun condition is out of plausible range	> 4.00 [%] < -3.25 [%]	Engine running System voltage in range Sensor is fully operative No SQA learning is active Enabled in combustion mode No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	> 11.00[V] OXY_NOx1_O2_RawNotRib == FALSE FAD_SQA_LrnET_Enbl == FALSE refer to supporting table (**KaOXYD_b_NOx1OvrnChkCmbModeEnbl**) < 350.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_O2_NOx1PlausMdlFit OXY_NOx1SignRngChkFlt FHPJnjLeakageFA EGR_PstnShtOffReqFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) (MAP_SensorFA AND	Time counter: (120 +1) failures out of 240 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						MAP_SensorTFTKO)		
					Stable fuel cut-off condition has been reached i.e. following conditions are met for a calibrateable time:	> 3.50 [s]		
					a. Engine speed in operating range	> 600 [rpm] < 3,000 [rpm]		
					b. EGR position	< 60.00 [%]		
					c. No fuel injected			
					d. Air mass per cylinder in operating range	> 400.00 [mg] < 1,500.00 [mg]		
					Estimated 02 concentration stable i.e. difference between initial and actual value	< 0.20 [%]		
					Air mass flown since fuel cut-off condition	> 0.12 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 2	P229F	This diagnosis verifies that Post Catalyst NOx Sensor embedded current control circuit status is healthy	Check if the NOx2 Sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time+OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its setpoint b) Delta Ip2 <426nA/10msec c) Delta Ip1 < 2.34 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Delta IpO < 300 uA/10 msec b) Delta Ip1 < 2.34 uA around its set point > 0.50 % > 0.50 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx2 Sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	> 11.00V TRUE FALSE > 9.80 V TRUE TRUE <0.0625 > - 0.0625 > 10.00 sec TRUE NOX_Snsr2_FltSt ==FALSE **NOX_S2_StBitChkEnblCmbMode** <= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec	NOx stability flag time counter: 2 fails out of 2 samples. Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Low Bank 1 Sensor 2	P22A0	This diagnosis verifies Post Catalyst NOx Sensor read out of range low	Check if the NOx2 Sensor NOx concentration raw read is out of lower range: NOx raw read	 <-90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx2 Sensor No electrical failure on NOx2 Sensor Combustion mode dependent enabling flag No 02 plausibility in load fault on NOx2 No DTC active:	>-1 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B > 9.80 V TRUE N0X_N0x2_StBitChkFlt ==FALSE NOX_Snsr2_FltSt ==FALSE **NOX_S2_OutRngMinCmbMode** OXY_NOx2ChkLoadFlt ==FALSE P30B5	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit High Bank 1 Sensor 2	P22A1	This diagnosis verifies Post Catalyst NOx Sensor read out of range high	Check if the NOx1 Sensor NOx concentration raw read is out of higher range:		Powertrain relay voltage	> 11.00 V	Time counter: 360 fails out of 720 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
			NOx raw read	>2,990 ppm	No failure on NOx2 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_B		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No current control failure on NOx2 Sensor	N0X_N0x2_StBitChkFlt ==FALSE		
					No electrical failure on NOx2 Sensor	N0X_Snsr2_FltSt ==FALSE		
					Combustion mode dependent enabling flag	**NOX_S2_OutRngMaxCmbMode**		
					No 02 plausibility in load fault on NOx2	OXY_NOx2ChkLoadFlt ==FALSE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit	P22A3	This diagnosis verifies Post Catalyst NOx Sensor Heater Control pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Control pin	open circuit on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range No DTC active:	> 11.00 V TRUE FALSE > 9.80 V P30B5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit Low Voltage	P22A4	This diagnosis verifies Post Catalyst NOx Sensor Heater Control pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Control pin	groundshort on Heater Control pin	Powertrain relay voltage	> 11.00 V	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Control Circuit High Voltage	P22A5	This diagnosis verifies Post Catalyst NOx Sensor Heater Control pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Control pin	powershort on Heater Control pin	Powertrain relay voltage	> 11.00 V	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No DTC active:	P30B5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense Circuit	P22A6	This diagnosis verifies Post Catalyst NOx Sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 2 Heater Sense pin (HTemp)	open circuit on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range No DTC active:	> 11.00 V TRUE FALSE > 9.80 V P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 2	P22A7	This diagnosis verifies if the Post Catalyst NOx Sensor Heater raw resistance is in range	This diagnosis verifies if the Post Catalyst NOx Sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	<0.0625 >- 0.0625	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_B NOx Sensor Bus relay is commanded ON Delay timer once Sensor supply is in range (> 10.8 V) Delay timer once Sensor dewpoint is reached Delay timer once engine is overrun Delay timer once DPF combustion mode is not active No DTC active:	> 11.00 V FALSE TRUE >45 sec > 180 sec > 5 sec 30 sec P30B5	Time counter: 125 fails out of 250 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense Low Voltage	P22A8	This diagnosis verifies Post Catalyst NOx Sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 2 Heater Sense pin (HTemp)	groundshort on HTemp	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 2 Heater Sense High Voltage	P22A9	This diagnosis verifies Post Catalyst NOx Sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 2 Heater Sense (HTemp)	powershort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30B5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting Sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 2	P22B6	This DTC detects if O2 signal is lower than physical minimum value.	O2 signal lower than a minimum value	< -8.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx2_O2_RawNotRib == FALSE refer to supporting table **KaOXYD_b_NOx2SigRn(gEnblCmbMode**) NOX_Snsr2_NotVld	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 2	P22B7	This DTC detects if 02 signal is higher than physical maximum value	02 signal higher than a maximum value	> 27.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs		Time counter: 100 failures out of 200 samples. Time task 25 [ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 1	P22FB	This diagnosis verifies the plausibility of Engine Out NOx Sensor signal	Check if (Engine Out NOx Sensor signal - NOx Model)/NOx Model with EWMA filter is above or below two calibratable thresholds	<-51 % OR > 70.00 %	Engine is running	TRUE	Test per trip: 1	Type A, 1 Trips
					Powertrain relay voltage	>11.00V	If Fast Initial Response EWMA is active then 1 test per trip are allowed	
					No failure on any NOx model inputs	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					Injection small quantity adjustment (SQA) learning is not active	FAD_SQA_LrnET_Enbl ==FALSE	If Rapid Response EWMA is active then 2 test per trip are allowed	
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE	The signal for the monitor check is calculated at first collecting and averaging 100.00 samples, than filtering the resulting mean value by means of a first-order filter.	
					No DTC active:	P30B4		
					No electrical failure on NOx1 Sensor	NOX_Snsr1_FltSt ==FALSE		
					No out of range low failure on NOx1 Sensor	NOX_NOx1_OutOfRngLoFit ==FALSE		
					No out of range high failure on NOx1 Sensor	NOX_NOx1_OutOfRngHiFit ==FALSE	The filter gain calibration (1) can assume the following values: -0.75 if FIR is active - 0.25 if RR is active -0.16 if neither FIR and RR are active	
					No current control failure on NOx1 Sensor	NOX_NOx1_StBitChkFlt ==FALSE		
					No failure on outside air temperature Sensor	OAT_PtEstFiltFA ==FALSE		
					No failure on ambient air temperature Sensor	AmbPresDfltdStatus ==FALSE		
					no falut on upstream catalyst exhaust pressure model inputs	EGP_PresCatUpFlt ==FALSE	(1)The EWMA	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No failure on engine coolant temperature Sensor	ECT_Sensor_FA ==FALSE	filter is active if the filter gain is calibrated with a value lower than 1, otherwise EWMA filter is cal-out.	
					No failure on injectors	FUL_GenericInjSysFlt ==FALSE		
					No failure on high pressure fuel rail system	FHPJnjLeakage ==FALSE		
					No failure on intake manifold absolute pressure Sensor	MAP_SensorFA==FALSE		
					Modeled Engine Out NOx concentration	> 105 ppm		
					Steady state detection: a) Modeled Engine Out NOx concentration step at 100 ms. b) condition a) is fulfilled for time	 < 5 ppm >3.00 sec		
					Ambient air pressure	>72 kPa <120 kPa		
					Outside air temperature	>-20 °C < 80 °C		
					Combustion mode dependent enabling flag	**NOX_S1_PlausChkEnblCmbMode**		
					Intake manifold absolute pressure	<250 kPA		
					Injection fuel quantity requested	For normal combustion mode: > 22.00 mm^3 < 50.00 mm^3		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						For other combustion modes: >20mm^3 <42mm^3		
					Engine speed	For normal combustion mode: > 1,240 rpm <1,620 rpm For other combustion modes: > 1,620 rpm < 1,225 rpm		
					Engine coolant temperature	>90 °C <120 °C		
					Sensor dewpoint is reached	TRUE		
					Diagnostic test results during EWMA FIR mode	< 1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 2	P22FE	This diagnosis verifies the Post Catalyst NOx Sensor sensing cells integrity during afterrun	Check if there is any clogging in the Post Catalyst NOx Sensor measurement cavities that could result in reduced NOx-sensitivity. The Sensor internal operating current set-points are changed such way, that the 02 concentration in 2nd Sensor cavity is around WOOppm. One test result is measured in fresh Sensor state (at supplier plant) and stored in the Sensor E2prom as diagnosis reference value. The diagnosis result is the ratio of current diagnosis value/reference value. The diagnosis result is processed with EWMA logic.	>125% OR < 75%	No electrical failure on N0x2 Sensor No out of range low failure on N0x2 Sensor No out of range high failure on N0x2 Sensor No failure on N0x2 CAN communication NO DTC active: No failure on N0x1 Sensor No failure on 02 from N0x1 plausibility diagnostics No failure on SCR system No failure on downstream SCR HC model inputs No failure on exhaust temperature Sensor (downstream SCR) No failure on HC injector No failure on Vehicle Speed Sensor	N0X_Snsr2_ElecFA ==FALSE NOX_NOx2_OutOfRngLo Fit ==FALSE N0X_N0x2_0ut0fRngHi Fit ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_B ==FALSE P30B5 N0X_Snsr1_N0x_Flt ==FALSE 0XY_N0x1_02_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq ==FALSE VehicleSpeedSensor_FA ==FALSE	Test per trip: 1 If Fast Initial Response EWMA is active then 2 test per trip are allowed If Rapid Response EWMA is active then 2 test per trip are allowed Task=500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No failure on any input of SCR chemical model	SCR_ChemicalMdlFlt ==FALSE		
					No current control failure on NOx2 Sensor	N0X_N0x2_StBitChkFlt ==FALSE		
					No 02 plausibility in load fault on N0x2	OXY_NOx2ChkLoadFlt ==FALSE		
					Powertrain relay voltage	>11.00V		
					N0x2 sensor supply in range	> 9.80 V		
					N0x2 sensor dewpoint is reached	TRUE		
					(N0x2 Sensor heater raw resistance - N0x2 Sensor heater target resistance) / N0x2 Sensor heater target resistence	<0.0625 >- 0.0625		
					a)combustion mode dependent enabling flag	**NOX_NOx2SelfTstEnblCmbMode**		
					b) condition a) is fulfilled for time	> 50 sec		
					c) engine speed	> 0 rpm < 1,500 rpm		
					d) condition c) is fulfilled for time	> 1 sec		
					e) After injection pulse is not used for time	> 1 sec		
					f) exhaust temperature Sensor (downstream SCR)	>-20 °C <400 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					g) exhaust mass flow	< 20 g/s		
					h) NH3 concentration	<800 ppm		
					j) conditions f) g) h) are fulfilled for time	> 5 sec		
					k) 02 concentration from N0x1	> 10%		
					i) NOx concentration from N0x1	< 1,000 ppm		
					l) conditions k) i) are fulfilled for time	> Osec		
					m) duty cycle applied to the HC injector driver	< 1 %		
					n) condition m) is fulfilled for time	> 5 sec		
					o) time between key off and last overrun	> 15 sec		
					p) time between key off and last DPF regen	> 10 sec		
					q) engine speed in idle range	< 800 rpm		
					r) fuel request in idle range	<20mm^3		
					s) conditions q) r) is fulfillled for time	< 1,800 sec		
					t) timer of condition s) is reset if one of the following condition is fulfilled (idle off			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					recognition - t) conditions):	>-20 °C		
					t.1) exhaust temperature (downstream SCR)	> 5 sec		
					t.2) condition t.1) is fulfilled for time (once idle has been detected)	> 5mph		
					t.3) vehicle speed	> 5 sec		
					t.4) condition t.3) is fulfilled for time (once idle has been detected)	> 30 g/sec		
					t.5) exhaust mass flow	> 5 sec		
					t.6) condition t.5) is fulfilled for time (once idle has been detected)	< 5g/s		
					u) HC mass flow (SCR downstream)			
					Once u) condition is fulfilled the following additional u.x) conditions shall be fulfilled to enable the monitor (AND logic)	> -20 g/s		
					u.1) exhaust temperature (downstream SCR)	> 22 sec		
					u.2) condition u.1) is fulfilled for time (once condition u) has been detected)			
						>= 5 mph		
					u.3) vehicle speed	> 10 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					u.4) condition u.3) is fulfilled for time (once condition u) has been detected) u.5) exhaust mass flow u.6) condition u.5) is fulfilled for time (once condition u) has been detected) v) deceleration before keyoff. w) condition v) could be ignored if idle engine condition w.x) is fulfilled w.1) engine speed in idle range w.2) condition w.1) fulfilled for time Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off when following conditions are fulfilled: a) O2 stabilization timer a) O2 concentration from NOx2	>22g/s > 5 sec < 4.00 m/s < 5.00 rpm < 10.00 rpm > 8.00 s > 30.00 s > -1,000.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Differential Pressure Sensor Circuit High Voltage	P2381	This monitor checks if the LP EGR differential pressure sensor is out of electrical range high	LP EGR differential pressure raw voltage value > high threshold	>98.00 [%]	Test enabled by calibration	==1.00	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Differential Pressure Sensor Circuit Low Voltage	P2382	This monitor checks if the LP EGR differential pressure sensor is out of electrical range low	LP EGR differential pressure raw voltage value < low threshold	<2.00 [%]	Test enabled by calibration	==1.00	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Differential Pressure Sensor Performance	P2383	This monitor checks if the LP EGR differential pressure sensor readings are plausible at key off	|Average reading value over a calibrateable number of raw samples! > threshold	>6.00 [%]	Test enabled by calibration	==1.00	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					PT relay supply voltage in range	> 11.00 [V]		
					No electrical faults on LP EGR differential pressure sensor	LPE_PresSnsrCktHiFA ==FALSE AND LPE_PresSnsrCktLoFA ==FALSE		
					No intermittent fault on LP EGR differential pressure sensor	LPE_PresSnsrIntFA ==FALSE		
					LP EGR differential pressure sensor offset learning successfully completed:			
					- number of read samples >= threshold;	>=50.00		
					- no missing default position active on exhaust throttle valve;	LEVJDfltPstnNotRchdFlt ==FALSE		
					- no faults present on LP EGR position sensor, LP EGR valve, LP EGR position control deviation;	LPE_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					- no electrical faults on LP EGR differential pressure sensor; - no intermittent fault on LP EGR differential pressure sensor. End Of Trip event has elapsed	LPE_PresSnsrCktHiFA ==FALSE AND LPE_PresSnsrCktLoFA ==FALSE LPE_PresSnsrIntFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation Differential Pressure Sensor Circuit Intermittent	P2384	This monitor checks the LP EGR differential pressure sensor for too fast changes in the pressure values	|Difference between two consecutive raw readings] > threshold	>10.00 [%]	Test enabled by calibration	==1.00	960.00 fail counts out of 1,200.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					Diagnostic system enabled (no clear code or EOT in progress)			
					System out of the cranking phase			
					Ignition run crank active			
					PT relay supply voltage in range	>11.00 [V]		
					No electrical faults on LP EGR differential pressure sensor	LPE_PresSnsrCktHiFA ==FALSE AND LPE_PresSnsrCktLoFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Range/ Performance Bank 1 Sensor 3	P23AD	This diagnosis verifies that Post Second Catalyst NOx Sensor embedded current control circuit status is healthy	Check if the NOx3 sensor embedded stability criteria of Nox/Lambda current control circuit are violated NOx stability flag: (OFF_Time/TOTAL_time) Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time +OFF_Time	Stability flag for NOx signal is set to OFF if one of the following condition is not fulfilled: a) V2 within an interval of 40mV around its setpoint b) Delta Ip2 <426nA/10msec c) Delta Ip1 < 2.34 uA aorund its set point Stability flag for Lambda signal is set to OFF if one of the following condition is not fulfilled: a) Delta IpO < 300 uA/10 msec b) Delta Ip1 < 2.34 uA around its set point > 0.50 % > 0.50 %	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C No DTC active: Sensor supply in range Engine is not cranking Sensor dewpoint is reached Sensor heater is in range: a) (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence b) condition a) is fulfilled for time Engine is running No electrical failure on NOx2 sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time	> 11.00 V TRUE FALSE P30D5 > 9.80 V TRUE TRUE <0.0625 >- 0.0625 > 10.00 sec TRUE NOX_Snsr3_FltSt ==FALSE **NOX_S3_StBitChkEnblCmbMode** <= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec	NOx stability flag time counter: 2 fails out of 2 samples Lambda stability flag time counter: 2 fails out of 2 samples Task=12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit Low Bank 1 Sensor 3	P23AE	This diagnosis verifies Post Second Catalyst NOx Sensor read out of range low	Check if the NOx3 sensor NOx concentration raw read is out of lower range: NOx raw read	 <-90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx3 CAN communication No DTC active: Sensor supply in range Sensor dewpoint is reached No current control failure on NOx3 sensor No electrical failure on NOx3 sensor Combustion mode dependent enabling flag No 02 plausibility in load fault on NOx3	>-1 mm^3 > 11.00 V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_C == FALSE P30D5 > 9.80 V TRUE N0X_N0x3_StBitChkFlt ==FALSE N0X_Snsr3_FltSt ==FALSE **NOX_S3_OutRngMinCmbMode** OXY_NOx3ChkLoadFlt ==FALSE	Time counter: 100 fails out of 200 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Circuit High Bank 1 Sensor 3	P23AF	This diagnosis verifies Post Second Catalyst NOx Sensor read out of range high	Check if the NOx3 sensor NOx concentration raw read is out of higher range:		Powertrain relay voltage	>11.00V	Time counter: 120 fails out of 240 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
			NOx raw read	>2,990 ppm	No failure on NOx2 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_C == FALSE		
					No DTC active:	P30D5		
					Sensor supply in range	> 9.80 V		
					Sensor dewpoint is reached	TRUE		
					No current control failure on NOx3 sensor	N0X_N0x3_StBitChkFlt ==FALSE		
					No electrical failure on NOx3 sensor	N0X_Snsr3_FltSt ==FALSE		
					Combustion mode dependent enabling flag	**NOX_S3_OutRngMaxCmbMode**		
					No 02 plausibility in load fault on NOx3	OXY_NOx3ChkLoadFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Heater Control Circuit	P23B1	This diagnosis verifies Post Second Catalyst NOx Sensor Heater Control pin Open Load Circuit	Check if there is an open circuit on NOx Sensor 3 Heater Control pin	open circuit on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range No DTC active:	> 11.00 V TRUE FALSE > 9.80 V P30D5	Time counter: 20 fails out of 40 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Heater Control Circuit Low Voltage	P23B2	This diagnosis verifies Post Second Catalyst NOx Sensor Heater Control pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 3 Heater Control pin	groundshort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Heater Control Circuit High Voltage	P23B3	This diagnosis verifies Post Second Catalyst NOx Sensor Heater Control pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 3 Heater Control pin	powershort on Heater Control pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Heater Sense Circuit	P23B4	This diagnosis verifies Post Second Catalyst NOx Sensor Heater sense resistance measurement pin for Open Load Circuit	Check if there is an open circuit on NOx Sensor 3 Heater Sense pin (HTemp)	open circuit on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range No DTC active:	> 11.00 V TRUE FALSE > 9.80 V P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Heater Sense Circuit Range/ Performance Bank 1 Sensor 3	P23B5	This diagnosis verifies if the Post Second Catalyst NOx Sensor Heater raw resistance is in range	This diagnosis verifies if the Downstream NOx sensor Heater raw resistance is out of speficied range: (Sensor heater raw resistance - sensor heater target resistance) / sensor heater target resistence	<0.0625 >- 0.0625	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_C NOx Sensor Bus relay is commanded ON Delay timer once sensor supplyisin range (> 10.8 V) Delay timer once sensor dewpoint is reached Delay timer once engine is overrun Delay timer once DPF combustion mode is not active No DTC active:	> 11.00 V FALSE TRUE > 200 sec > 200 sec > 5 sec 200 sec P30D5	Time counter: 125 fails out of 250 samples Task=25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Supply Voltage Circuit Bank 1 Sensor 3	P23B6	This diagnosis verifies if the supply voltage of the Post Second Catalyst Nox Sensor is out of range	Check if NOxSensor 3 supply voltage status is out of range	Sensor supply voltage < 9.80 V	NOx sensor is Gen3.0	TRUE	Time counter: 125 fails out of 250 samples Task=25ms	Type B, 2 Trips
					Engine is running	TRUE		
					Powertrain relay voltage	> 11.00 V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	> Osec		
					CAN_LostComm_FltN_BusB_NOxSnsr_C	FALSE		
					No DTC active:	P30D5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Heater Sense Low Voltage	P23B8	This diagnosis verifies Post Second Catalyst NOx Sensor Heater sense resistance measurement pin for Short to Ground	Check if there is a short circuit to ground on NOx Sensor 3 Heater Sense pin (HTemp)	groundshort on HTemp	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor 3 Heater Sense High Voltage	P23B9	This diagnosis verifies Post Second Catalyst NOx Sensor Heater sense resistance measurement pin for Short to Battery	Check if there is a short circuit to power supply on NOx Sensor 3 Heater Sense (HTemp)	powershort on HTemp pin	Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_C Sensor supply in range Sensor dewpoint is reached No DTC active:	> 11.00 V TRUE FALSE > 9.80 V TRUE P30D5	Time counter: 20 fails out of 40 samples Continental NOx Sensors Gen 3.5 include an internal 1.5s debouncing time for electrical fault reporting needed to pinpoint the specific failure affecting sensor wires. Task=25ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Sensor Performance - Sensing Element Bank 1 Sensor 3	P23C1	This diagnosis verifies the Post Second Catalyst NOx Sensor sensing cells integrity during afterrun	Check if there is any clogging in the Post Second Catalyst NOx sensor measurement cavities that could result in reduced NOx-sensitivity. The sensor internal operating current set-points are changed such way, that the 02 concentration in 2nd sensor cavity increases to a target value. One test result is measured in fresh sensor state (at supplier plant) and stored in the sensor E2prom as diagnosis reference value. The diagnosis result is the ratio of current diagnosis value/reference value. The diagnosis result is processed with EWMA logic.	>125% OR < 75%	No electrical failure on N0x3 sensor No out of range low failure on N0x3 sensor No out of range high failure on N0x3 sensor No failure on N0x3 CAN communication No DTC active: No failure on N0x1 sensor No failure on 02 from N0x1 plausibility diagnostics No failure on UF-SCR system No failure on downstream UF-SCR HC model inputs No failure on exhaust temperature sensor (downstream UF-SCR) No failure on HC injector No failure on Vehicle Speed sensor	N0X_Snsr3_ElecFA ==FALSE NOX_NOx3_OutOfRngLo Fit ==FALSE N0X_N0x3_0ut0fRngHi Fit ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_C ==FALSE P30D5 N0X_Snsr1_FltSt ==FALSE 0XY_N0x1_02_Flt ==FALSE EXF_TotExhSCR_UpFlt ==FALSE SCR_HC_SCR_DwnFlt ==FALSE EGT_TempSCR_DwnFlt ==FALSE HCI_GenericShtOffReq ==FALSE VehicleSpeedSensor_FA ==FALSE SCR_ChemicalMdlFlt	Test per trip: 1 If Fast Initial Response EWMA is active then 2 test per trip are allowed If Rapid Response EWMA is active then 2 test per trip are allowed Time = 500ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No failure on any input of UF-SCR chemical model	==FALSE		
					No current control failure on NOx3 sensor	N0X_N0x3_StBitChkFlt ==FALSE		
					No 02 plausibility in load fault on N0x3	OXY_NOx3ChkLoadFlt ==FALSE		
					Powertrain relay voltage	>11.00V		
					N0x3 sensor supply in range	> 9.80 V		
					N0x3 sensor dewpoint is reached	TRUE		
					(N0x3 Sensor heater raw resistance - N0x3 sensor heater target resistance) / N0x3 sensor heater target resistence	<0.0625 >- 0.0625		
					a) combustion mode dependent enabling flag	**NOX_NOx3SelfTstEnblCmbMode**		
					b) condition a) is fulfilled for time	> 5 sec		
					c) engine speed	> 0 rpm < 1,500 rpm		
					d) condition c) is fulfilled for time	> 1 sec		
					e) After injection pulse is not used for time	> 1 sec		
					f) exhaust temperature sensor (downstream UF-SCR)	>-20 °C <400 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					g) exhaust mass flow	< 20 g/s		
					h) NH3 concentration	<600 ppm		
					j) conditions f) g) h) are fulfilled for time	> 5 sec		
					k) 02 concentration from N0x1	> 2 %		
					i) NOx concentration from N0x1	<600 ppm		
					l) conditions k) i) are fulfilled for time	>0.00 sec		
					m) duty cycle applied to the HC injector driver	< 1 %		
					n) condition m) is fulfilled for time	> 5 sec		
					o) time between key off and last overrun	> 15 sec		
					p) time between key off and last DPF regen	> 10 sec		
					q) engine speed in idle range	< 800 rpm		
					r) fuel request in idle range	<20 mm^3		
					s) conditions q) r) is fulfillled for time	< 1,800 sec		
					t) timer of condition s) is reset if one of the following condition is fulfilled (idle off			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					recognition - t) conditions):	>-20 °C		
					t.1) exhaust temperature (downstream UF-SCR)	> 5 sec		
					t.2) condition t.1) is fulfilled for time (once idle has been detected)	> 5mph		
					t.3) vehicle speed	> 5 sec		
					t.4) condition t.3) is fulfilled for time (once idle has been detected)	> 30 g/sec		
					t.5) exhaust mass flow	> 5 sec		
					t.6) condition t.5) is fulfilled for time (once idle has been detected)	< 20g/s		
					u) HC mass flow (UF-SCR downstream)			
					Once u) condition is fulfilled the following additional u.x) conditions shall be fulfilled to enable the monitor (AND logic)	> -20 g/s		
					u.1) exhaust temperature (downstream UF-SCR)	>20 sec		
					u.2) condition u.1) is fulfilled for time (once condition u) has been detected)	>= 5 mph		
					u.3) vehicle speed	> 10 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					u.4) condition u.3) is fulfilled for time (once condition u) has been detected) u.5) exhaust mass flow u.6) condition u.5) is fulfilled for time (once condition u) has been detected) v) deceleration before keyoff w) condition v) could be ignored if idle engine condition w.x) is fulfilled w.1) engine speed in idle range w.2) condition w.1) fulfilled for time Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off when following conditions are fulfilled: a) 02 stabilization timer a) 02 concentration from N0x3	>18g/s > 5 sec < 4.00m/s^2 < 5.00 rpm < 10.00 rpm > 15.00 s > 30.00 s > -1,000.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Recirculation (EGR) 2 Cooling System Performance	P241F	This monitor checks the LP EGR Cooler efficiency deterioration, that would cause vehicle's emissions to exceed specific emission levels.	LP EGR Cooler Efficiency (averaged over a calibration cumulative transient time) is compared with a threshold.	< 50.00 [%]	Calibration on diagnostic enabling	1.00==TRUE	Test executed after 200.00 samples are collected and their average is computed	Type B, 2 Trips
					PT Relay voltage in range	Powertrain relay voltage > 11. 00 [V]		
			LP EGR Cooler efficiency is computed as the ratio between (LP EGR cooler upstream temperature - LP EGR cooler downstream temperature) and (LP EGR cooler upstream temperature - LP EGR cooler inlet coolant temperature).		Engine is running or cranking	==TRUE	functional task 100 ms	
					Difference between LP EGR cooler upstream temperature and LPE cooler inlet coolant temperature	> 120.00 [°C] < 300.00 [°C]		
			Each sample of the computed LP EGR Cooler Efficiency (before the average) is corrected by an offset depending on the LP EGR flow.	**P241F: Efficiency Offset [%]**	Ambient Temperature	>= -20.00 [°C]		
					Ambient pressure	>= 69.60 [kPa]		
					Air Control is Active	Refer to "Air Control Active" Free Form		
					Engine Coolant Temperature	> 60.00 [°C]		
					(OR OBD Coolant Enable Criteria),	==TRUE		
					AND Engine Coolant Temperature	< 130.00 [°C]		
					LP EGR flow (filtered) in range, with hysteresis on	> 5.00 [g/s] (ENABLE) < 2.00 [g/s] (DISABLE)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					the minimum threshold	< 40.00 [g/s]		
					for a time	>= 12.00 [s]		
					LP EGR flow estimation is valid	LPE_VlvTotFlowNotVld ==FALSE		
					Engine speed in range	< 3,000.00 [rpm] > 1,050.00 [rpm]		
					Estimated LP EGR cooler inlet coolant flow	> 8.00 [l/min]		
					LP EGR cooler inlet coolant flow estimation is valid	CECR_SystemFlowEstimate_FA ==FALSE		
					No fault on LP EGR cooler upstream temperature sensor	EGT_SnsrDPF_DwnFA ==FALSE		
					No fault on LP EGR cooler downstream temperature sensor	LPE_TempSnsrFA ==FALSE		
					No fault on LP EGR cooler inlet coolant temperature sensor	EECR_LPE_InletCoolant_FA ==FALSE		
					No fault on Ambient Temperature sensor			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OAT_PtEstFiltFA ==FALSE		
					No fault on ambient pressure sensor	AAP_AmbientAirPresDfltd ==FALSE		
					No fault on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					No fault on engine speed	CrankSensor_FA ==FALSE		
					No fault on LP EGR valve	LPE_PstnShtOffReq ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 stuck in range monitoring	P242B	This monitor has the purpose of warning the system/driver that EGT 3 sensor behavior is not plausible in a way that the signal coming from the sensor is stuck when expected to change. Failure modes:sensor internal malfunctions (stuck output) The difference between the maximum EGT value and the EGT sensor signal (converted raw signal) is lower than an expected temperature variation for a certain observation time, once a minimum amount of fuel has been injected. The following parameters are evaluated starting from the read converted raw temperature value, through calibratable maps: - Observation time window - Expected temperature variation - Minimum amount of injected fuel	The difference between maximum EGT 2 value and EGT 2 sensor signal is lower than an expected temperature variation for a certain observation time, once a minimum amount of fuel has been injected.	**EGT3 Stuck Temperature <=Variation** [°C] **EGT3 Stuck Wait >Time** [s] **EGT3 Fuel request integral**	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine running AND No faults on EGT3 sensor (electrical and plausibility in and logic) AND Minimum elapsed time in engine-off phase AND Engine not running error flag AND	1 [Boolean] ==FALSE == TRUE EGT_ExhGas3_CktTFTK 0 AND EGT_ExhGas3_CktFA AND EGT_ExhGas3_RatTFTK 0 AND EGT_ExhGas3_RatFA AND EGT_ExhGas3_QckChgF A AND EGT_ExhGas3_QckChgT FTKO >10,800 [s] ==FALSE	No debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Supply voltage in range	>11.00 [V]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring Low	P242C	This monitor has the purpose of warning the system/driver that an electrical problem on EGT 3 sensor is present. Failure mode: Out Of Range Low (short circuit to ground) The monitor compares the EGT raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected.	The monitor compares the EGT 3 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected.	<40.00 [Ohm]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status	1 [Boolean] == FALSE == TRUE == TRUE == FALSE	10 fail samples over 20 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 out of range monitoring High	P242D	This monitor has the purpose of warning the system/driver that an electrical problem on EGT 3 sensor is present. Failure modes: Out Of Range High (open circuit, short circuit to supply, broken wiring) The monitor compares the EGT raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected.	The monitor compares the EGT 3 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR High error is detected.	>400,000.00 [Ohm]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status	1 [Boolean] == FALSE == TRUE == TRUE == FALSE	10 fail samples over 20 samples Function task: 100ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust gas temperature sensor (EGT) 3 quick change monitoring	P242E	This function has the purpose of warning the system/driver that EGT 3 sensor signal is varying too fast with respect to the expected signal dynamic. Failure modes: - Sensor internal malfunctions - Wiring harness deterioration - Connectors electrical issues The monitor compares EGT 3 sensor signal (converted raw value) with two calibratable thresholds (minimum and maximum ones). Thresholds are dynamically evaluated by the SW.	The monitor compares EGT 3 sensor signal with two calibratable thresholds.Thresholds are dynamically evaluated by the SW as: 1) Maximum value between the last valid EGT temperature value + resolution error and a value obtained considering maximum calibratable value that can be read by the sensor, last valid EGT temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant 2) Minimum value between the last valid EGT temperature value - resolution error and a value obtained considering minimum calibratable value that can be read by the sensor, last valid EGT temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant	**EGT ExhGas3 > QckChgMaxThrsh[°C]** **EGT ExhGas3 < QckChgMinThrsh[°C]**	Monitor enabled by dedicated calibration AND Ignition run crank active AND Engine cranking AND Supply voltage in range AND No electrical faults affecting the sensor AND Punctual electrical errors affecting the sensor	1 [Boolean] ==TRUE ==FALSE > 11.00 [V] EGT_ExhGas3_CktFA AND EGT_ExhGas3_CktTFTK 0 ==FALSE	20 fail samples out of 30 samples Function task: 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Differential Pressure Too Low	P244A	This diagnostic detects a DPF pressure sensor pipe disconnected or clogged or blocked or a removed Diesel Particulate Filter	Measured DPF absolute pressure	< **Exhaust Gas Pressure Too Low Threshold** [kPa]	Test enabled by calibration No error on relative-to-ambient pressure sensor (electrical, rationality and offset) No error on air flow meter No error on atmospheric pressure sensor Exhaust gas volume flow Engine speed Engine coolant temperature OR OBD Coolant Enable Criteria Pipe Icing Risk Low	1.00==TRUE EGP_DiffPresSnsrFlt ==FALSE MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE AmbPresDfltdStatus= CeAAPR_e_AmbPresNotDfltd > 120.00 [l/s] > 1,000.00 [rpm] > -40.00 [°C] OR ==TRUE ==TRUE	60.00 failures over 80.00 samples Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Differential Pressure Too High	P244B	This diagnostic detects a clogged DPF.	in case a calibratable value is set to true than the average calculation ration, function of pressure sensor and exhaust flow calculated in a calibratable window 100.00 else the average calculation ration, function of pressure sensor and exhaust flow calculated in a calibratable window 100.00	1.00 >the average threshold calculation value function of soot load and temperature sensor **>TooHiThreshold**	Test enabled by calibration AND Engine mode run AND No fault on Upstream Exhaust Gas Temperature AND No Fault on EGP Sensor AND No fault on Exhaust mass flow AND Soot load model valid AND Upstream Exhaust Gas Temperature inside a calibratable range with hysteresis AND Exhaust throttle valve measured position with hysteresis AND Soot Load value inside a calibratable threshold with	1.00 ==TRUE EGT_TempDPF_UpFlt EGP_DiffPresSnsrFlt EXF_TotExhaustFlt ==TRUE <500.00 >200.00 10.00 <12.00 >0.00 0.00 <90.00 >0.00 1.00	Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					hysteresis AND Exhaust mass Flow with hysteresis	 5.00 <15.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Catalyst Temperature Too Low During Regeneratio n	P244C	This diagnosis detects an Injector or a catalyst that is malfunctioning or losses in the exhaust gas system	The DTC is set when: Counter of subsequent Interrupted regeneration The interrupted regeneration counter increases only when the interruption is caused by: - Regeneration process interrupted due to maximum regeneration time elapsed. Time allowed to complete DPF regeneration is expired (according to regeneration mission profile) OR - Post injection pulses not enabled in time. Time to release POST injection is expired (according to regeneration mission profile) OR - Regeneration Steady phase not entered in time. Time to reach DPF regeneration steady state condition is expired (according to regeneration mission profile)	 > 0.00 [Cnt] > **Maximum allowed time to complete regeneration** [s] > **Maximum allowed time to release post injections for regeneration** [s] > **Maximum allowed time to reach steady state for regeneration** [s]	Test enabled by calibration	1.00 ==TRUE	No time required, i.e. as soon as the malfunction criteria is satisfied Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			The counter is reset when a successful DPF regeneration occurs					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor offset monitoring	P2452	This monitor verifies if the differential pressure for the particulate filter, checked in no flow conditions (0 kPa expected differential pressure when the engine is not running), is out of specification (sensor accuracy)	A fault is detected once the calculated differential pressure sensor offset exceeds a maximum allowed threshold	> 2.20 [%]	Monitor enabled by dedicated calibration	1.00 [Boolean]	No debounce	Type B, 2 Trips
					AND			
					Engine movement detection	==FALSE	Function task: 12.5 ms	
					AND			
					Key on condition	==TRUE		
					AND			
					Minimum elapsed time in engine not running mode is passed	>21,600.00 [s]		
					AND			
					Minimum time elapsed after the switch to key on phases is passed	> 0.02 [s]		
					AND			
					Minimum elapsed time, after the minimum engine not running time in key on, is passed	==13.00 [ent] (13.00*12.5 ms gives the learning duration)		
					AND			
					Offset rationality monitor report done	==FALSE		
					AND			
					Pipe Icing Risk Low	==TRUE		
					Faults affecting the	==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine off timer AND No electrical, rationality or quick change faults affecting the sensor	 EGP_DiffPresQckChgFlt AND EGP_DPS_CktFlt AND EGP_DiffPresSnsrRatFlt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor stuck in range monitoring	P2453	This monitor detects a stocked signal, reporting a failure if the signal does not change when it is expecteded to (during transition phases)	Differential pressure variation lower than expected	<= 0.15 [%]	Monitor enabled by dedicated calibration AND Engine movement detection AND No electrical, plausibility, offset and quick change faults affecting the sensors AND Engine speed variation AND Fuel quantity variation Pipe Icing Risk Low	1.00 [Boolean] ==TRUE EGP_DPS_OfstTFTKO AND EGP_DPS_QckChgFlt AND EGP_DPS_CktFlt AND EGP_DiffPresStkFltPresent >200.00 [rpm/s] >10.00 [l/s] ==TRUE	21.00 fail samples out of 30.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor out of range monitoring Low	P2454	This monitor refers to electrical fails on the differential pressure sensor, covering the out of range low. The monitor compares the raw differential pressure signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Signal voltage raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a short to ground; a fault is detected when the value is lower than a certain threhsold.	<3.00 [%]	Monitor enabled by dedicated calibration AND Engine cranking phase AND Key on condition AND Supply voltage in range	1.00 [Boolean] == FALSE ==TRUE > 11.00 [V]	80.00 fail samples out of 160.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor out of range monitoring High	P2455	This monitor refers to electrical fails on the differential pressure sensor, covering the out of range high. The monitor compares the raw differential pressure signal with a maximum threshold. If this threshold is overcome, an open circuit (for analog sensors) or a short circuit to battery is detected.	Signal raw value is compared to the voltage clamp value reported on the sensor datasheet, referring to a open circuit or a short to battery; a fault is detected when the value exceeds a certain threhsold.	> 97.00 [%]	Monitor enabled by dedicated calibration AND Engine cranking phase AND Key on condition AND Supply voltage in range	1.00 [Boolean] == FALSE ==TRUE > 11.00 [V]	80.00 fail samples out of 160.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor quick change monitoring	P2456	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold	Difference between two subsequent differential pressure raw signal samples exceeds a certain threshold	>20.00 [%]	Monitor enabled by dedicated calibration	1.00 [Boolean]	36.00 fail samples out of 240.00 samples	Type B, 2 Trips
					AND			
					Engine cranking phase	== FALSE	Function task: 12.5 ms	
					AND			
					Key on condition	==TRUE		
					AND			
					Supply voltage in range	> 11.00 [V]		
					AND			
					Electrical errors flags (out of range high/low, loss of communication in case of digital sensor)	== FALSE		
					AND			
					No electrical fault on exhaust gas pressure sensor (out of range high/ low, loss of communication in case of digital sensor)	EGP_DPS_CktFlt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Regeneration Frequency	P2459	This diagnostic detects a too high DPF regeneration frequency due to inefficient combustion, inefficient regeneration, soot overestimated by models or leaks in the exhaust or the intake line. When a new regeneration is started, the diagnostic computes a ratio between the soot level estimated by the model that has triggered the regeneration and the soot level estimated by the Nominal Engine Out soot model, which gives information about the expected soot level in the DPF. If the ratio is greater than a threshold, the diagnostic will report a fail. In case the regeneration is started based on miles travelled or time passed since last regeneration, the diagnostic will always report a pass. The test results can be optionally filtered by an EWMA filter.	When the regeneration is started by a soot model, the ratio between the soot level from that model and the soot level estimated by the Nominal Engine Out model is calculated. Monitor configuration: *EWMA Enable* = 1.00 **a)** In case of EWMA filter not enabled *(EWMA Enable* == 0), the calculated ratio is **b)** In case of EWMA filter enabled *(EWMA Enable* == 1), the calculated ratio is OR, if a P2459 fault is already active, the calculated ratio is	 >= 5.08 >= 7.20 >= 7.20	Test enabled by calibration A new DPF regeneration is started At least one successful regeneration has already occurred The previous regeneration was completed successfully The regeneration is requested at service Just before the new regeneration is started, Delta Pressure (Ap) soot model was valid for a time (*) Delta Pressure (Ap) plus Configurable Correction Block (CCB) soot model was valid for a fraction of the soot loading time (*) The Nominal Engine Out soot model was valid for a fraction of the soot loading time (**)	1.00 == TRUE == TRUE == TRUE == FALSE >= 0.00 s >0.49 >0.49	No time required, the malfunction criteria are evaluated as soon as a new DPF regeneration is started. Function task: 100 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run/crank voltage	>11.00V		
					Extreme transient engine operation was not detected, i.e. the delta fuel request during the soot loading time was	< 100.00 mm3/s		
					(*) Condition is ignored if the regeneration is not triggered by this model			
					(**) Condition is ignored if the regeneration is started based on miles or time since last regeneration			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Soot Accumulatio n	P2463	This diagnostic detects a clogged DPF needing to be regeneration at service	Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 130.00 [Pct]	Test enabled by calibration	1.00==TRUE	120.00 failures over 150.00 samples function task: 100 ms	Type A, 1 Trips
					No fault on DPF pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrFlt ==FALSE		
					No fault on downstream catalyst temperature sensor (electrical and rationality) with the exception of the fault on ANDRADC	EGT_SnsrCatDwnFlt ==FALSE (if TRUE, then ANDR FA ==TRUE)		
					No fault on air flow meter	MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE		
					No fault on atmospheric pressure sensor	AmbPresDfltdStatus = CeAAPR_e_AmbPresNot Dfltd		
					DPF status in sootloading phase (no regeneration ongoing)	DPF_DPF_St == CeDPFR_e_SootLoading		
					Engine speed	> 500.00 [rpm]		
					No fault on exhaust mass flow estimation	EXF_TotExhDPF_UpFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	> 32.00 [l/s] for > 2.00 [s]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	> 0.00 [DegC] AND < 700.00 [DegC] for > 0.00 [s]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 0.00 [DegC] ==TRUE		
					Ambient Temperature	> -40.00 [DegC]		
					Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time	> = 0.10 % of the soot loading		
					Soot model based on Delta Pressure is always valid for a time	>= 5.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Restriction - Ash Accumulation	P24A4	This diagnostic detects a clogged DPF that has to be replaced	Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 300.00 [Pct]	Test enabled by calibration	1.00==TRUE	20.00 failures over 30.00 samples function task: 100 ms	Type A, 1 Trips
					No fault on DPF pressure sensor (electrical, rationality and offset)	EGP_DiffPresSnsrFlt ==FALSE		
					No fault on downstream catalyst temperature sensor (electrical and rationality) with the exception of the fault on ANDRADC	EGT_SnsrCatDwnFlt ==FALSE (if TRUE, then ANDR FA ==TRUE)		
					No fault on air flow meter	MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE		
					No fault on atmospheric pressure sensor	AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd		
					DPF status in soot loading phase (no regeneration ongoing)	DPF_DPF_St == CeDPFR_e_SootLoading		
					Engine speed	> 500.00 [rpm]		
					No fault on exhaust mass flow estimation	EXF_TotExhDPF_UpFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	>32.00 [l/s] for >2.00 [s]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	> 0.00 [DegC] AND < 700.00 [DegC] for > 0.00 [s]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 0.00 [DegC] ==TRUE		
					Ambient Temperature	> -40.00 [DegC]		
					Soot model based on Delta Pressure plus configurable correction block (CCB) is valid for a time	> = 0.10 % of the soot loading		
					Soot model based on Delta Pressure is always valid for a time	>= 5.00 s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit Range/ Performance	P24AF	This diagnosis detects a soot sensor memory corruption	Soot sensor sensitivity factor is	<-0.25 OR >0.25	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Transmission fault with sensor control unit not present	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFlt) NOT(P30BC)	Time counter: 100.00 failures out of 120.00 samples 1000 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit Low	P24B0	This diagnosis detects an open circuit on the soot sensor electrode signal or a cracked electrode	Soot Sensor Electrode raw current 1 AND Soot Soot Electrode raw current measured at setpoint temperature 1 - Soot Soot Electrode raw current measured at setpoint temperature 2	< 2.00A < 0.09A	Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on No Electrical faults present on Soot Sensor Soot Sensor is in regeneration phase Soot Sensor temperature Soot Sensor Electrode current measurement enabled Transmission fault with sensor control unit not present	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFlt) 560.00 < T < 800.00 °C NOT(P30BC)	No time debounce	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Circuit High	P24B1	This diagnosis detects a short to power the soot sensor electrode signal	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Electrode supply voltage (measured ADC voltage for electrode current)	>4.1 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply Soot sensor is not in regeneration status	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24DO)	Time counter: 10.00 consecutive failures OR 18.00 failures out of 36.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Heater Control Circuit/Open	P24B3	This diagnosis detects an open circuit on the soot sensor heater line	Diagnosis executed in Soot Sensor Control Unit: Soot Sensor Heater current	1< 0.5AOR 1> 15A	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle No Heater failures detected in the Sensor Control Unit ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	>0% NOT(SBR_RlyFA) NOT(U02A3) NOT(P24DO)	Time counter: 20.00 consecutive failures OR 38.00 failures out of 76.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Heater Control Circuit Low	P24B5	This diagnosis detects a short to ground on the soot sensor heater line	Diagnosis executed in Sensor Control Unit: Soot Sensor Heater current	1< 0.5AOR 1> 15A	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle No Soot Sensor Heater failures detected in the Sensor Control Unit ECU conditions: Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Fault not active on undervoltage for Soot Sensor Control Unit supply	>0% NOT(SBR_RlyFA) NOT(U02A3) NOT(P24DO)	Time counter: 20.00 consecutive failures OR 38.00 failures out of 76.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Heater Control Circuit High	P24B6	This diagnosis detects a short to power on the soot sensor heater line	Diagnosis executed in Soot Sensor Control Unit:		Soot Sensor Control Unit conditions:		Time counter: 10.00 consecutive failures OR 18.00 failures out of 36.00 samples 100 ms/sample	Type B, 2 Trips
			Soot Sensor Heater current	> 0.2 A	Soot Sensor Heater Off			
			OR		ECU conditions:			
			Soot Sensor Heater switch output (off state)	= 1 (for one of the last 5 measurements)	Ignition voltage in range	> 11.00		
			OR					
			Soot Sensor Heater switch input (off state)	= 1 (for one of the last 5 measurements)	Soot Sensor bus relay is commanded on			
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT(U02A3)		
					Key is turned on			
					Engine not in cranking mode			
					Fault not active on undervoltage for Soot Sensor Control Unit supply	NOT(P24DO)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Matter Sensor Temperature Circuit Performance	P24C7	This diagnosis detects a soot sensor removed from the exhaust line, a soot sensor temperature sensor damaged or a possible parasitic resistance on the wiring harness between the soot sensor heater and the soot sensor control unit.	The absolute value of the difference between the Soot Sensor Electrode and the electrode temperature model	>100.00 °C	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine in running mode No electrical fault detected on Soot Sensor Soot Sensor heater is not commanded Soot Sensor is in measurement operating status Exhaust gas temperature model is valid	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_ElecIFlt) SOT_ExhTempSootSnsrVld AND SOT_TotExhSootSnsrVld AND NOT(OAT_PtEstFiltFA) AND AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd AND NOT (VehicleSpeedSensor FA)	Time counter: 250.00 failures out of 255.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust gas temperature model is reliable, i.e.: (Ambient air pressure Ambient air temperature Exhaust gas volumetric flow at soot sensor) Time after sensor regeneration Temperature estimated by the sensor probe temperature model - Electrode temperature	> 60.00 kPa > -20.00 °C > 35.00 mg/s >300.00 s OR > 100.00 °C > 155.00 °C NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Temperature estimated by the sensor probe temperature model - Outside air temperature Transmission fault with sensor control unit not present			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Temperature Circuit Low	P24C8	This diagnosis detects a short to ground on the soot sensor temperature signal	Diagnosis executed in Soot Sensor Control Unit: Voltage of Soot Sensor temperature meander (TM) signal	< 0.3 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24DO)	Time counter: 2.00 consecutive failures OR 2.00 failures out of 2.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Temperature Circuit High	P24C9	This diagnosis detects a short to power or an open circuit on the soot sensor temperature signal	Diagnosis executed in Soot Sensor Control Unit: Voltage of Soot Sensor temperature meander (TM) signal	> 3 V	Soot Sensor Control Unit conditions: no conditions ECU conditions: Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode Fault not active on undervoltage for Soot Sensor Control Unit supply	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P24DO)	Time counter: 2.00 consecutive failures OR 2.00 failures out of 2.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Supply Voltage Circuit Low	P24D0	This diagnosis detects a short to ground of the soot sensor voltage supply line	Soot Sensor Control Unit supply voltage	< 9.00 V	Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Key is turned on Engine not in cranking mode (The sensor is in regneration phase OR the time from a regeneration request)	> 11.00 NOT(SBR_RlyFA) NOT(U02A3) > 90.00	Time counter: 5.00 consecutive failures OR 8.00 failures out of 16.00 samples 100 ms/sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Regeneration Incomplete	P24D1	This diagnosis detects a degradation of the soot sensor heater	the Soot Sensor Electrode Temperature is during the steady state soot sensor regeneration, for a consecutively time	<= (785.00-10.00)°C < 43.00 s	Key is turned on Ignition voltage in range Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No electrical fault detected on Soot Sensor Volumetric flow estimation is valid The power ratio timer the power ratio timer increments during the steady state of soot sensor regeneration, when the ratio between power demand and power available is (Soot sensor transitioned from regeneration to	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(SOT_EleclFlt) SOT_TotExhSootSnsrVld AND SOT_ExhTempSootSnsrVld AND SOT_ExhPresSootSnsrVld < 5.00 s 0.00 <= r <= 1.00	no debouncing time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					measurement status OR the time of soot sensor steady state regeneration is) Transmission fault with sensor control unit not present	 >= 45.00 s NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sensor Exhaust Sample Error Bank 1	P24DA	This diagnosis detects a soot sensor that has been removed from exhaust line or is clogged	Integrated derivative of corrected volumetric flow AND Integrated derivative of effective soot sensor heater voltage (i,e, cumulated heater voltage change)	> 2,100.00 < 2.18V	Key is turned on Ignition voltage in range Engine in running mode Soot Sensor bus relay is commanded on No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor No Soot Sensor supply undervoltage detected No electrical fault detected on Soot Sensor No fault on exhaust gas pressure estimation at sensor location No fault on exhaust gas temperature estimation at sensor location No fault on gas mass flow estimation at sensor location Soot Sensor in protection heating operating state Derivative in volumetric flow	 > 11.00 NOT(SBR_RlyFA) (U02A3) NOT(P24DO) NOT(SOT_ElecFlt) SOT_ExhPresSootSnsrVId SOT_ExhTempSootSnsrVId SOT_TotExhSootSnsrVId 2.00 < d2V < 300.00	No debounce time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for a time	> = 0.45 s		
					At InitCntrlr time since engine off	> 21,600.00 s		
					At InitCntrlr time since engine off is valid	NOT EngineModeNotRunTimer Error		
					The time from the Soot Sensor Heater is controlled in closed loop	> 45.00 s		
					As soon as Soot Sensor is supplied the time since PM sensor heating off (module off plus heating off)	> 0.00 s		
					Exhaust gas temperature at Soot Sensor	50.00 < T <250.00 °C		
					Environmental pressure	> 75.0 kPa		
					Diagnostic has not yet reported a pass or failure			
					The sign of derivative in volumetric flow does not change for a time	>= 0.50 s		
					Transmission fault with sensor control unit not present	NOT(P30BC)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger VGT A Position Sensor Circuit Low (SENT position sensor)	P2564	This monitor checks if the VGT SENT position sensor is out of electrical range low	SENTposition raw voltage < low threshold	< 1.00 [%]	Test enabled by calibration	==1.00	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					No faults present on VGT SENT out of range and SENT performance	VGT_SENT_OOR_Flt ==FALSE VGT_SENT_PerfFlt ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge rVGTA Position Sensor Circuit High (SENT position sensor)	P2565	This monitor checks if the VGT SENT position sensor is out of electrical range high	SENTposition raw voltage > high threshold	> 99.00 [%]	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range No faults present on VGT SENT out of range and SENT performance	== 1.00 >11.00 [V] VGT_SENT_OOR_Flt ==FALSE VGT_SENT_PerfFlt ==FALSE	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharge r VGT A Stuck Closed (Single and Two stage VGT DC Motor)	P2599	This monitor detects the VGT vanes mechanically stuck in a certain position different from their defaulted position (fully open) when the actuator is no longer driven (missing defaulted position)	Position after P0046 has set > threshold	>25.00 [%]	P0046 is already set Waiting time after driver shut off > minimum threshold (needed for the spring to drive the valve in its defaulted position) VGT position closed loop control active (no faults present on VGT position sensor, VGT vanes, VGT position control deviation)	 >2.00 [s] VGT_PstnSnsrFA ==FALSE VGT_ActCktFA==FALSE VGT_PstnCntrlFA ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 1	P2627	This DTC detects if O2 signal is lower than physical minimum value.	O2 signal lower than a minimum value	< -8.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00[V] OXY_NOx1_O2_RawNotRib == FALSE refer to supporting table **KaOXYD_b_NOx1SigRn (gEnblCmbMode**) NOX_Snsr1_NotVld	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 1	P2628	This DTC detects if 02 signal is higher than physical maximum value.	02 signal higher than a maximum value	> 27.00 [%]	Engine running System voltage in range Sensor is fully operative Exhaust gas pressure No Exhaust Brake active i.e. intake manifold pressure No pending or confirmed DTCs	 > 11.00[V] OXY_NOx1_O2_RawNotRib == FALSE < 500.00 [kPa] < 200.00 [kPa] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt (MAP_SensorFA AND MAP_SensorTFTKO)	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 1 Injector Data Incompatible	P268C	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 1 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 1 EIA code not written via DID (DID $60).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injector Data Incompatible	P268D	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 2 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 2 EIA code not written via DID (DID $61).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 3 Injector Data Incompatible	P268E	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 3 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 3 EIA code not written via DID (DID $62).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 4 Injector Data Incompatible	P268F	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 4 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 4 EIA code not written via DID (DID $63).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 5 Injector Data Incompatible	P2690	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 5 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 5 EIA code not written via DID (DID $64).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 6 Injector Data Incompatible	P2691	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 6 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 6 EIA code not written via DID (DID $65).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 7 Injector Data Incompatible	P2692	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 7 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 7 EIA code not written via DID (DID $66).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 8 Injector Data Incompatible	P2693	This DTC detects if the EIA (End of line Injector Adjustment) code for cylinder 8 has not been programmed. The diagnostic shall report test pass if the EIA code has been succesfully programmed, otherwise shall report test fail and set the DTC. It is always enabled in production phase, but not in development phase.	Cylinder 8 EIA code not written via DID (DID $67).	N/A	Ignition ON Diagnosis enabled via calibration Production phase (Production Controller == TRUE AND Manufacturer Enable Counter (MEC) == 0) OR Development phase (Production Controller == FALSE) AND EIA codes are programmed via DID	 1.00 [Boolean] NOT (0.00 OR 0.00)	N/A	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Too High Bank 1	P28F7	This monitor checks if exhaust gas pressure is too high due to ETV wrong position (e.g. ETV broken linkage, between top and bottom valve shafts, and valve is stuck closed)	Measured LPE delta pressure	> 80.00 [kPa]	Test enabled by calibration	== 1.00	960.00 fail counts out of 1,200.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					Engine running and out of the cranking phase			
					PT relay supply voltage in range	> 11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					Requested torque	> **P28F7: mimimum torque request** [Nm]		
					No fault on LPE delta pressure sensor	LPE_PresSnsrFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC aims to detect a drift of measured 02 value (A) from an estimated concentration (B) when the latter can be considered stable during full load condition.	(A - B) in full load condition is out of plausible range	> 5.20 [%] < -3.25 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode (No After injection release AND Boolean Flag used to enable After injection status is TRUE) No pending or confirmed DTCs Stable fuel cut-off condition has been reached i.e. following	> 11.00[V] OXY_NOx1_O2_RawNotRib == FALSE refer to supporting table (**KaOXYD_b_NOx1LoadChkCmbModeEnbl**) 0 [boolean] NOX_Snsr1_NotVld N0X_Snsr1_PresFlt OXY_NOx1SignRngChkFlt OXY_O2_NOx1PlausMdlFlt FHPJnjLeakageFA (MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO) EGR_VlvTotFlowNotValid	Time counter: (120+1) failures out of 240 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					conditions are met for a calibrateable time:	> 1.00 [s]		
					a. Engine speed in operating range	> 1,000 [rpm] < 2,000 [rpm]		
					b. EGR mass flow	< 1,000.00 [mg]		
					c. Injected fuel quantity in operating range	> 10.00 [mm^3] < 50.00 [mm^3]		
					d. Air mass per cylinder in operating range	> 400.00 [mg] < 1,500.00 [mg]		
					Estimated 02 concentration stable i.e. difference between initial and actual value	< 0.20 [%]		
					Air mass flown since fuel cut-off condition	>0.10 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Range/ Performance Bank 1 Sensor 2	P2A01	This DTC aims to detect a drift of Sensor 2 O2 measured value (A) from Sensor 1 O2 measured value (B) when the latter can be considered stable during full load condition.	(A - B) in full load condition is out of plausible range	> 6.00 [%] < -6.00 [%]	Engine running System voltage in range Sensor is fully operative Sensor 1 is fully operative No pending or confirmed DTCs DTC P2A00 is running Air mass flown since P2A00 enabled Air mass flown since P2A00 disabled	> 11.00[V] OXY_O2_NOx2_PresCmpNotRIb == FALSE OXY_O2_NOx1_PresCmpNotRIb == FALSE NOX_Snsr2_NotVld NOX_Snsr2_PresFlt OXY_NOx2SignRngChkFlt OXY_NOx1_O2_Flt (MAF_SensorFA AND MAF_SensorTFTKO) (see P2A00 Fault code) >0.10 [g] > 2.00 [g]	Time counter: (120+1) failures out of 240 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Circuit Range/ Performance Bank 1 Sensor 3	P2A02		(A - B) in full load condition is out of plausible range	> 10.00[%] < -10.00 [%]	Engine running		Time counter: (120.00+1) failures out of 240.00 samples. Time task 25[ms]	Type B, 2 Trips
					System voltage in range	> 11.00[V]		
					Sensor is fully operative	OXY_O2_NOx3_PresCmpNotRIb == FALSE		
					Sensor 2 is fully operative	OXY_O2_NOx2_PresCmpNotRIb == FALSE		
					No pending or confirmed DTCs	NOX_Snsr3_NotVld NOX_Snsr3_PresFlt OXY_NOx3SignRngChkFlt OXY_NOx1_O2_Flt (MAF_SensorFA AND MAF_SensorTFTKO)		
					DTC P2A01 is running	(see P2A01 Fault code)		
					Air mass flown since P2A01 enabled	> 0.05 [g]		
					Air mass flown since P2A01 disabled	>5.00 [g]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Position Exceeded Learning Limit (SENT position sensor)	P2B97	This monitor checks if the ETV SENT position sensor has an offset with respect to the nominal positions where the valve does the learning procedure (fully closed and/or fully open)	SENT position raw voltage when the valve is in fully closed position < low threshold OR SENT position raw voltage when the valve is in fully closed position > high threshold OR SENT position raw voltage when the valve is in wide open position < low threshold OR SENT position raw voltage when the valve is in wide open position > high threshold	<6.00 [%5V] OR >14.50 [%5V] OR <73.00 [%5V] OR >93.00 [%5V]	Test enabled by calibration Key signal is off Learning procedure at key off in fully closed and/or wide open positions have been successfully completed: - engine coolant temperature in range; - no faults present on engine coolant temperature sensor; - outside air temperature above a threshold; - no faults present on outside air temperature sensor. Position control in closed loop: battery voltage above a threshold No faults present on ETV position sensor, ETV valve, ETV position control deviation End Of Trip event has elapsed	==1.00 >=30.00 [°C] <=150.00 [°C] ECT_Sensor_FA ==FALSE >=-40.00 [°C] OAT_PtEstFiltFA ==FALSE >=9.50 [V] LEV_PstnShtOffReq ==FALSE	No debounce is present: DTC sets as soon as the error is present Function task: at key off	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diagnostic system enabled (no clear code or EOT in progress)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Supply Circuit	P2B98	This monitor checks if the ETV DC-Motor is correctly supplied	System voltage supply lower than a threshold (error information provided by HWIO)	< 6 [V]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Pressure Control Valve "A" Motor Overtemperature	P2B99	This monitor checks if the temperature of the ETV DC-Motor increases too much (e.g. ETV DC-Motor internal faults, etc).	H-Bridge driver temperature higher than a threshold (error information provided by HWIO)	> 170 [°C]	Test enabled by calibration	==1.00	240.00 fail counts out of 300.00 sample counts Function task: 12.5 ms	Type A, 1 Trips
					System out of the cranking phase			
					PT relay supply voltage in range	>11.00 [V]		
					Diagnostic system enabled (no clear code or EOT in progress)			
					HWIO error status different from INDETERMINATE status			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 3	P2C63	This DTC detects if O2 signal is lower than physical minimum value.	O2 signal lower than a minimum value	<-8.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx3_O2_RawNotRib == FALSE refer to supporting table **KaOXYD_b_NOx3_SigRngEnblCmbMode**) NOX_Snsr3_NotVld	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 3	P2C64	This DTC detects if 02 signal is higher than physical maximum value	02 signal higher than a minimum value	> 27.00 [%]	Engine running System voltage in range Sensor is fully operative Enabled in combustion mode No pending or confirmed DTC	 > 11.00 [V] OXY_NOx3_O2_RawNotRib == FALSE refer to supporting table **KaOXYD_b_NOx3_SigRngEnblCmbMode**) NOX_Snsr3_NotVld	Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor loss of communication	U0601	This monitor refers to electrical fails on the differential pressure sensor, due to loss communication issues. It is digital sensors specific. The monitor evaluates several digital inputs to determine if a loss of communication occured.	Loss of communication error is detected in one of the cases below: 1) Digital differential pressure sensor message fault higher than a fixed value 2) Minimum digital differential pressure sensor message age is reached	 > 0 >0.00 [s]	Test enabled by calibration AND Digital sensor enabled AND Engine cranking phase AND key on AND Battery voltage	1.00 [Boolean] 0.00 [Boolean] == FALSE ==TRUE > 11.00 [V]	65,535.00 fail samples out of 0.00 samples Function task: 12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Intake Manifold Runner Position Sensor	U064F	This monitor checks if the Swirl SENT position sensor protocol has performance problems	Swirl SENT position internal fault indication (message error) OR (Swirl SENT position refresh time (age error) AND (Swirl SENT position protocol status OR Swirl SENT position protocol status OR A new Swirl SENT message has been received))	== TRUE > 6.25 [ms] == STEADY HIGH == STEADY LOW	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range	==1.00 >11.00 [V]	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Exhaust Pressure Control Valve "A" Sensor	U0650	This monitor checks if the ETV SENT position sensor protocol is out of range low, out of range high or has performance problems	(HWIO counter of valid ETV SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO ETV SENT position protocol status) OR (HWIO time counter since last valid ETV SENT position was transmitted > threshold (age error = TRUE) AND HWIO ETV SENT position protocol status) OR (HWIO message fault on ETV SENT position = TRUE OR	>6.25 [ms] AND ==STEADY LOW >6.25 [ms] AND ==STEADY HIGH message error==TRUE OR	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	==1.00 >11.00 [V]	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(number of ETV SENT position counters has been updated AND HWIO time counter since last valid ETV SENT position was transmitted > threshold (age error = TRUE)))	-------- AND >6.25 [ms]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With EGR Sensor "A"	U0651	This monitor checks if the HP EGR SENT position sensor protocol is out of range low, out of range high orl has performance problems	(HWIO counter of valid HP EGR SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO HP EGR SENT position protocol status) OR (HWIO time counter since last valid HP EGR SENT position was transmitted > threshold (age error = TRUE) AND HWIO HP EGR SENT position protocol status) OR (HWIO message fault on HP EGR SENT position ==TRUE OR	>6.25 [ms] AND ==STEADY LOW >6.25 [ms] AND ==STEADY HIGH message error==TRUE OR	Test enabled by calibration SENT position sensor present System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	==1.00 ==1.00 >11.00 [V]	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(number of HP EGRSENT position counters has been updated AND HWIO time counter since last valid HP EGRSENT position was transmitted > threshold (age error = TRUE)))	-------- AND >6.25 [ms]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With EGR Sensor "C"	U0653	This monitor checks if the LP EGR SENT position sensor protocol is out of range low, out of range high or has performance problems	(HWIO counter of valid LP EGR SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO LP EGR SENT position protocol status) OR (HWIO time counter since last valid LP EGR SENT position was transmitted > threshold (age error = TRUE) AND HWIO LP EGR SENT position protocol status) OR (HWIO message fault on LP EGR SENT position = TRUE OR	>6.25 [ms] AND ==STEADY LOW >6.25 [ms] AND ==STEADY HIGH message error==TRUE OR	Test enabled by calibration SENT position sensor present System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	==1.00 ==1.00 >11.00 [V]	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(number of LP EGRSENT position counters has been updated AND HWIO time counter since last valid LP EGRSENT position was transmitted > threshold (age error = TRUE)))	-------- AND >6.25 [ms]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Diesel Intake Air Flow "A" Position Sensor	U0654	This monitor checks if the Throttle position sensor protocol is out of range low, out of range high or has performance problems	(HWIO counter of valid Throttle SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE) AND HWIO Throttle SENT position protocol status) OR (HWIO message fault on Throttle SENT position == TRUE OR	> 6.25 [ms] AND == STEADY LOW > 6.25 [ms] AND == STEADY HIGH message error==TRUE OR	Test enabled by calibration System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	== 1.00 >11.00 [V]	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(number of Throttle SENT position counters has been updated AND HWIO time counter since last valid Throttle SENT position was transmitted > threshold (age error = TRUE)))	 ------------- AND > 6.25 [ms]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Turbocharger/ Supercharger Boost Control "A" Position Sensor	U0656	This monitor checks if the VGT position sensor protocol is out of range low, out of range high or has performance problems	(HWIO counter of valid VGT SENT position indications no longer updated > threshold (age error = TRUE) AND HWIO VGT SENT position protocol status) OR (HWIO time counter since last valid VGT SENT position was transmitted > threshold (age error = TRUE) AND HWIO VGT SENT position protocol status) OR (HWIO message fault on VGT SENT position == TRUE OR	> 6.25 [ms] AND == STEADY LOW > 6.25 [ms] AND == STEADY HIGH message error==TRUE OR	Test enabled by calibration VGT SENT position sensor present System out of the cranking phase PT relay supply voltage in range Diagnostic system enabled (no clear code or EOT in progress)	== 1.00 == 1.00 >11.00 [V]	480.00 fail counts out of 600.00 sample counts Function task: 6.25 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			(number of VGT SENT position counters has been updated AND HWIO time counter since last valid VGT SENT position was transmitted > threshold (age error = TRUE)))	 ------------- AND > 6.25 [ms]				

Initial Supporting table - FastFailTempDiff

Description: EOT Sensor Cold Start Fast Fail Threshold

Value Units: Threshold between power-up engine oil temperature and power-up engine coolant temperature (Deg C)
X Unit: PowerUp coolant temperature (deg C)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	79.5	79.5	79.5	60.0	60.0	39.8	39.8	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Initial Supporting table - P0196_TotalAccumulatedFlow

Description: Total accumulated air consumed by engine since engine start as a function of powerup undefaulted Oil Temperature

Value Units: Minimum accumulated (total) air grams consumed by engine (gram)
X Unit: PowerIlp   coolant temperature (deg C)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	15,000	14,000	13,000	12,000	11,000	10,000	9,000	8,000	7,000	6,000	5,000	4,000	5,000	4,000	3,000	3,000	3,000

Initial Supporting table - Ambient correction on distance

Description: Ambient pressure correction for threshold on Distance covered since last regeneration

Value Units: [0; 2]
X Unit: kPa

y/x	70	72	80	90	92	100
1	1	1	1	1	1	1

Initial Supporting table - Ambient correction on time

Description: Ambient pressure correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: kPa

y/x	70	72	80	90	92	100
1	1	1	1	1	1	1

Initial Supporting table - Distance since last regeneration

Description: Base value to trigger regeneration for distance covered since last regeneration, function of regeneration priority

Value Units: km
X Unit: enumerative (mission profiles)

Distance since last regeneration - Part 1

y/x	CeDPFC_e_RgnPriority_0	CeDPFC_e_RgnPriority_1	CeDPFC_e_RgnPriority_2	CeDPFC_e_RgnPriority_3	CeDPFC_e_RgnPriority_4	CeDPFC_e_RgnPriority_5
1	1,000	1,000	1,000	1,000	1,000	1,000

Distance since last regeneration - Part 2

y/x	CeDPFC_e_RgnPriority_6	CeDPFC_e_RgnPriority_7	CeDPFC_e_RgnPriority_8	CeDPFC_e_RgnPriority_9	CeDPFC_e_RgnPriority_10	CeDPFC_e_RgnPriority_11
1	1,000	1,000	1,000	1,000	1,000	1,000

Distance since last regeneration - Part 3

y/x	CeDPFC_e_RgnPriority_12	CeDPFC_e_RgnPriority_13	CeDPFC_e_RgnPriority_14	CeDPFC_e_RgnPriority_15	CeDPFC_e_RgnPriority_16	
1	1,000	1,000	1,000	1,000	1,000	

Initial Supporting table - DPF Load correction on distance

Description: Map of DPF Load correction for threshold on distance covered since last regeneration

Value Units: [0; 2]
X Unit: % DPF load

y/x	20	40	50	70	75	80	90	95
1	1	1	1	1	1	1	1	1

Initial Supporting table - DPF Load correction on time

Description: Map of DPF Load correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: % DPF load

y/x	20	40	50	70	75	80	90	95
1	1	1	1	1	1	1	1	1

Initial Supporting table - DPF_CCB_SootThrsh

Description: Soot threshold in CCB ON check, function of engine speed and requested fuel

Value Units: % Soot
X Unit: rpm
Y Units: mm^3

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table ■DPF_EffRgnHysHi

Description: Table of hysteresis High minimum DPF temperature which provides effective regeneration, function of exhaust gas mass flow (x axis) and percentage of ideal regeneration achieved (y axis)

Value Units: °C
X Unit: g/s
Y Units: %

y/x	5	10	15	20	25	30	35	40	45	50	60	70	90	110	130
0	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
5	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
10	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
15	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
20	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
25	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
30	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
40	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
50	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
60	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
70	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
75	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
80	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
85	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
90	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
95	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
100	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
105	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
110	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530

Initial Supporting table - DPF_EffRgnHysLo

Description: Table of hysteresis Low minimum DPF temperature which provides effective regeneration, function of exhaust gas mass flow (x axis) and percentage of ideal regeneration achieved (y axis)

Value Units: °C
X Unit: g/s
Y Units: %

y/x	5	10	15	20	25	30	35	40	45	50	60	70	90	110	130
0	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
5	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
10	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
15	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
20	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
25	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
30	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
40	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
50	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
60	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
70	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
75	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
80	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
85	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
90	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
95	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
100	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
105	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
110	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520

Initial Supporting table - DPF ResistFlowDsblHi

Description: Maximum fuel quantity threshold to permit resistive flow calculations, function of engine speed

Value Units: mm^3
X Unit: rpm

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	130	130	130	130	130	130	130	130

Initial Supporting table - DPF ResistFlowDsblLo

Description: Minimum fuel quantity threshold to permit resistive flow calculations, function of engine speed

Value Units: mm^3
X Unit: rpm

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_SootThrshCrtn

Description: Soot threshold correction based on soot value in CCB.

Value Units: [0, 4]
X Unit: % Soot

y/x	0	20	40	60	80	100	120	140
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT ExhGasI QckChgMaxThrsh

Description: Maximum value between the last valid EGT1 temperature value + resolution error and a value obtained considering maximum calibratable value that can be read by the sensor, last valid EGT1 temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant

y/x	1
1	1,000

Initial Supporting table - EGT ExhGasI QckChgMinThrsh

Description: Minimum value between the last valid EGT1 temperature value - resolution error and a value obtained considering minimum calibratable value that can be read by the sensor, last valid EGT1 temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant

y/x	1
1	-40

Initial Supporting table - EGT ExhGas2 QckChgMaxThrsh

Description: Maximum value between the last valid EGT2 temperature value + resolution error and a value obtained considering maximum calibratable value that can be read by the sensor, last valid EGT2 temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant

y/x	1
1	1,000

Initial Supporting table - EGT ExhGas2 QckChgMinThrsh

Description: Minimum value between the last valid EGT2 temperature value - resolution error and a value obtained considering minimum calibratable value that can be read by the sensor, last valid EGT2 temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant

y/x	1
1	-40

Initial Supporting table - EGT ExhGas3 QckChgMaxThrsh

Description: Maximum value between the last valid EGT3 temperature value + resolution error and a value obtained considering maximum calibratable value that can be read by the sensor, last valid EGT3 temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant

y/x	1
1	1,000

Initial Supporting table - EGT ExhGas3 QckChgMinThrsh

Description: Minimum value between the last valid EGT3 temperature value - resolution error and a value obtained considering minimum calibratable value that can be read by the sensor, last valid EGT3 temperature value and a weight coefficient function of the current amount of samples detected as failed by the monitor and the calibratable sensor time constant

y/x	1
1	-40

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description: Injected fuel higher hysteresis threshold, function of engine speed

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,100	1,500	2,500	3,000	3,500	4,000	5,000
1	-5	-5	-5	-5	-5	-5	-5	5

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description: Injected fuel lower hysteresis threshold, function of engine speed

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,100	1,500	2,500	3,000	3,500	4,000	5,000
1	-5	-5	-5	-5	-5	-5	-5	5

Initial Supporting table - EGT FuelReqMaxThreshold

Description: Maximum Fuel Request threshold for Catalyst Inlet Temperature Control enabling conditions

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,750	2,500	3,000	3,500	4,000	4,500
1	50	50	60	60	60	30	0	0

Initial Supporting table - EGT FuelReqMinThreshold

Description: Minimum Fuel Request threshold for Catalyst Inlet Temperature Control enabling conditions

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,750	2,500	3,000	3,500	4,000	4,500
1	0	0	0	0	0	0	0	0

Initial Supporting table - EnginePointEnable DPF TempDeviation

Description: Map to enable DPF Control Temperature Deviation monitoring, function of engine speed and desired fuel.

Value Units: [Boolean]
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	2,000	2,500	3,000	3,010	4,000	4,200
0	0	0	0	0	0	0	0	0
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1
61	1	1	1	1	1	1	1	1

Initial Supporting table - Exhaust Gas Pressure Too Low Threshold

Description: Diagnostic threshold for the exhaust gas pressure too low monitoring, function of the exhaust gas flow and of the soot trapped in the DPF

Value Units: kPa
X Unit: l/s
Y Units: % DPF load

y/x	10	20	60	100	140	200	200	200
40	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0

Initial Supporting table - Flow Resistance Too Low Threshold

Description: Diagnostic threshold for the flow resistance too low monitoring, function of the soot trapped in the DPF.

Value Units: kPa/(l/s)
X Unit: % DPF load

y/x	10	20	60	100	140	200	200	200
1	0	0	0	0	0	0	0	0

Initial Supporting table - K EffExhFlowCond

Description: Enablement table, function of exhaust flow and SCR average temperature [boolean] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: boolean
X Unit: °C
Y Units: g/s

y/x	200	210	220	230	240	250	260	270	290	310	330	350	360	390	400
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
20	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
30	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
40	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
50	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
60	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
65	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
70	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
75	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
80	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
90	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
100	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - K_EffExhFlowCond_SCR2

Description: Enablement table, function of exhaust flow upstream SCR2 and SCR2 average temperature [boolean] for SCR2 monitoring (P2C7A)

Value Units: boolean
X Unit: °C
Y Units: g/s

y/x	190	210	220	240	260	270	280	290	300	310	320	340	360	380	400
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
20	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
25	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
30	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
40	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
50	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
60	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
70	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
80	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
90	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - KaFADC_n_SQC_HysThrsh

Description: Engine speed hysteresis function of driveline group for SQC enable.

KaFADC_n_SQC_HysThrsh - Part 1

y/x	CeFADR_e_CBE_DrvlnGrpNotAlwd	CeFADR_e_CBE_DrivelineGrp1	CeFADR_e_CBE_DrivelineGrp2	CeFADR_e_CBE_DrivelineGrp3
1	10	10	10	10

KaFADC_n_SQC_HysThrsh - Part 2

y/x	CeFADR_e_CBE_DrivelineGrp4	CeFADR_e_CBE_DrivelineGrp5	CeFADR_e_CBE_DrivelineGrp6	CeFADR_e_CBE_DrivelineGrp7
1	10	10	10	10

KaFADC_n_SQC_HysThrsh - Part 3

y/x	CeFADR_e_CBE_DrivelineGrp8	CeFADR_e_CBE_DrivelineGrp9	CeFADR_e_CBE_DrivelineGrp10	
1	10	10	10	

Initial Supporting table - KaOXYD_b_NOx3_SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx3_SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	0	0

KaOXYD_b_NOx3_SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaOXYD_b_NOx3_SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

KaOXYD_b_NOx3_SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - Lo_FR_MontrEnblHiThrsh

Description: High enabling threshold on the requested fuel for the flow resistance too low monitoring, function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	5,000
1	100	100	100	100	100	100	100	100

Initial Supporting table - Lo_FR_MontrEnblLoThrsh

Description: Low enabling threshold on the requested fuel for the flow resistance too low monitoring, function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	5,000
1	5	5	5	5	5	5	5	5

Initial Supporting table - m_NH3_StrgDevErrMax_SCR2

Description: Upper boundary of SCR2 NH3 storage deviation error [g] (difference between SCR2 estimated storage and its set-point) for SCR2 monitoring (P2C7A)

Value Units: g
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgDevErrMaxThrsh

Description: Upper boundary of NH3 storage deviation error [g] (difference between SCR2 estimated storage and its set-point) for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgDevErrMin_SCR2

Description: Lower boundary of SCR2 NH3 storage deviation error [g] (difference between SCR2 estimated storage and its set-point) for SCR2 monitoring (P2C7A)

Value Units: g
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - m_NH3_StrgDevErrMinThrsh

Description: Lower boundary of NH3 storage deviation error [g] (difference between SCR estimated storage and its set-point) for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgMax_SCR2

Description: Upper boundary of SCR2 estimated NH3 storage [g] for SCR2 monitoring (P2C7A)

Value Units: g
XUnit: °C
Y Units: g/s

y/x	10	20	30	40	50	60	80	100
220	2	2	2	2	2	2	1	1
250	1	1	1	1	1	1	1	1
280	1	1	1	1	1	1	1	1
300	1	1	1	1	1	1	1	1
320	1	1	1	1	1	1	1	1
340	1	1	1	1	1	1	1	1
360	1	1	1	1	1	1	1	1
380	1	1	1	1	1	1	1	1
400	1	1	1	1	1	1	1	1

Initial Supporting table - m_NH3_StrgMaxAge_SCR2

Description: Upper boundary of SCR2 estimated NH3 storage [g] for SCR2 monitoring (P2C7A) when SCR2 catalyst is aged

Value Units: g
XUnit: °C
Y Units: g/s

y/x	10	20	30	40	50	60	80	100
220	2	2	2	2	2	2	1	1
250	1	1	1	1	1	1	1	1
280	1	1	1	1	1	1	1	1
300	1	1	1	1	1	1	1	1
320	1	1	1	1	1	1	1	1
340	1	1	1	1	1	1	1	1
360	1	1	1	1	1	1	1	1
380	1	1	1	1	1	1	1	1
400	1	1	1	1	1	1	1	1

Initial Supporting table - m_NH3_StrgMaxThrsh

Description: Upper boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	2	2	2	2	2	2	2	2

Initial Supporting table - m_NH3_StrgMin_SCR2

Description: Lower boundary of SCR2 estimated NH3 storage [g] for SCR2 monitoring (P2C7A)

Value Units: g
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_NH3_StrgMinThrsh

Description: Lower boundary of estimated NH3 storage [g] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: g
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	0	0	0	0	0	0	0	0

Initial Supporting table - m_SlipN0xIntglThrsh_SCR2

Description: NOx integral threshold [mg] to enable SCR2 slip condition based on SCR2 average temperature for SCR2 monitoring (P2C7A)

Value Units: mg
X Unit: °C

y/x	220	270	320	370
1	1,700	1,700	1,700	1,700

Initial Supporting table - Maximum allowed time to complete regeneration

Description: Time allowed to complete DPF regeneration, function of mission profile.

Value Units: seconds
X Unit: enumerative (mission profiles)

Maximum allowed time to complete regeneration - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	3,600	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to complete regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	3,600	3,600	3,600	3,600	3,600	3,600	7,200

Maximum allowed time to complete regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	3,600	3,600	3,600	3,600	3,600		

Initial Supporting table - Maximum allowed time to reach steady state for regeneration

Description: Time to reach DPF regeneration steady state condition, function of mission profile.

Value Units: seconds
X Unit: enumerative (mission profiles)

Maximum allowed time to reach steady state for regeneration - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	2,200	2,200	2,200	2,200	2,200	2,200	2,200

Maximum allowed time to reach steady state for regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	2,200	2,200	2,200	2,200	2,200	2,200	2,200

Maximum allowed time to reach steady state for regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	2,200	2,200	2,200	2,200	2,200		

Initial Supporting table - Maximum allowed time to release post injections for regeneration

Description: Time to release POST injection, function of mission profile.

Value Units: seconds
X Unit: enumerative (mission profiles)

Maximum allowed time to release post injections for regeneration - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	3,600	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to release post injections for regeneration - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	3,600	3,600	3,600	3,600	3,600	3,600	3,600

Maximum allowed time to release post injections for regeneration - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	3,600	3,600	3,600	1,200	3,600		

Initial Supporting table - Mission profile correction on distance

Description: Curve of Mission profile dependent correction for threshold on distance covered since last regeneration

Value Units: [0; 2]
X Unit: enumerative (mission profiles)

Mission profile correction on distance - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	1	1	1	1	1	1	1

Mission profile correction on distance - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	1	1	1	1	1	1	1

Mission profile correction on distance - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	1	1	1	1	1		

Initial Supporting table - Mission profile correction on time

Description: Curve of Mission profile dependent correction for threshold on time spent since last regeneration

Value Units: [0; 2]
X Unit: enumerative (mission profiles)

Mission profile correction on time - Part 1

y/x	CeDPFR_e_MisProfO	CeDPFR_e_MisProf1	CeDPFR_e_MisProf2	CeDPFR_e_MisProf3	CeDPFR_e_MisProf4	CeDPFR_e_MisProf5	CeDPFR_e_MisProf6
1	1	1	1	1	1	1	1

Mission profile correction on time - Part 2

y/x	CeDPFR_e_MisProf7	CeDPFR_e_MisProf8	CeDPFR_e_MisProf9	CeDPFR_e_MisProf10	CeDPFR_e_MisProf11	CeDPFR_e_MisProf12	CeDPFR_e_MisProf13
1	1	1	1	1	1	1	1

Mission profile correction on time - Part 3

y/x	CeDPFR_e_MisProf14	CeDPFR_e_MisProf15	CeDPFR_e_MisProf16	CeDPFR_e_MisProf17 Srv	CeDPFR_e_MisProf18 Rec		
1	1	1	1	1	1		

Initial Supporting table - NOX_NOx3SelfTstEnblCmbMode

Description:

NOX_NOx3SelfTstEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_NOx3SelfTstEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_NOx3SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_NOx3SelfTstEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S3_OfstMntrEnblCmbMode

Description:

NOX_S3_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

NOX_S3_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S3_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_S3_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S3_OutRngMaxCmbMode

Description:

NOX_S3_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S3_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	0

NOX_S3_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	1	1	1	0

NOX_S3_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S3_OutRngMinCmbMode

Description:

NOX_S3_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S3_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	0

NOX_S3_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	1	1	1	0

NOX_S3_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S3_StBitChkEnblCmbMode

Description:

NOX_S3_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

NOX_S3_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S3_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_S3_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - P0128 Maximum Acculated Energy - Primary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTestO

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-10.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	10,880.0	10,305.0	8,580.0	6,855.0	5,705.0	5,130.0	3,175.0

Initial Supporting table - P0128 Maximum Acculated Energy - Secondary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-10.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	12,545.1	11,819.4	9,642.3	7,465.2	6,013.8	5,288.1	2,820.8

Initial Supporting table - P0128 Maximum Acculated Energy - Tertiary

Description: KtETHD_E_EOR_WrmUpEnrgyLimTest2

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-10.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	12,545.1	11,819.4	9,642.3	7,465.2	6,013.8	5,288.1	2,820.8

Initial Supporting table - P017B Maximum Accumulated Energy - Primary

Description: KtETHD_E_CMR_WrmUpEnrgyLimTestO

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum cylinder head metal for the key cycle (°C)

y/x	-10.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	10,880.0	10,305.0	8,580.0	6,855.0	5,705.0	5,130.0	3,175.0

Initial Supporting table - P017B Maximum Accumulated Energy - Secondary

Description: KtETHD_E_CMR_WrmUpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum cylinder head metal for the key cycle (°C)

y/x	-10.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	12,545.1	11,819.4	9,642.3	7,465.2	6,013.8	5,288.1	2,820.8

Initial Supporting table - P017B Maximum Accumulated Energy - Tertiary

Description: KtETHD_E_CMR_WrmUpEnrgyLimTest2

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum cylinder head metal for the key cycle (°C)

y/x	-10.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	12,545.1	11,819.4	9,642.3	7,465.2	6,013.8	5,288.1	2,820.8

Initial Supporting table - P01F0 - Heat To Coolant Min 2D

Description: KtETHD_P_CDD_HeatToCoolantMin

Value Units: Indicated Power (kW)
X Unit: Firing Fraction
Y Units: Ambient temperature (°C)

y/x	0.00	0.25	0.50	0.67	1.00
-10.0	10.2	10.2	10.2	10.2	10.2
0.0	9.0	9.0	9.0	9.0	9.0
10.0	8.5	8.5	8.5	8.5	8.5
20.0	5.0	5.0	5.0	5.0	5.0
50.0	5.0	5.0	5.0	5.0	5.0

Initial Supporting table - P026A: Efficiency Offset

Description: Charge Air Cooler Efficiency Offset, function of compressor total flow and water pump speed

Value Units: [%]
X Unit: [g/s]
Y Units: [rpm]

y/x	1,000	2,000	3,000	4,000	5,000	6,000	7,000
20	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0
200	0	0	0	0	0	0	1
250	0	0	0	0	0	1	1

Initial Supporting table - P0521_CVDOP_MaxOilPressure

Description: Maximum oil pressure threshold.

X Unit: Engine Speed, RPM

y/x	40	50	60	70	80	90	100	110	120
1,000	744	744	744	744	744	744	744	744	744
1,500	744	744	744	744	744	744	744	744	744
2,000	744	744	744	744	744	744	744	744	744
2,500	744	744	744	744	744	744	744	744	744
3,000	744	744	744	744	744	744	744	744	744
3,500	744	744	744	744	744	744	744	744	744
4,000	744	744	744	744	744	744	744	744	744
4,500	744	744	744	744	744	744	744	744	744
5,000	744	744	744	744	744	744	744	744	744

Initial Supporting table - P0521_CVDOP_MinOilPresFail

Description: Minimum Oil Pressure fail Threshold

X Unit: Engine Speed (RPM)

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000
1	25	32	38	45	52	59	65	68	71

Initial Supporting table - P062B_CSM_ASIC_RAMCorruption_FailLim

Description: Fail Limit for Controller Status Monitoring - ASIC in case of RAM Corruption fail: CeFULD_Cnt_RAMCorruptionFailLim

y/x	1
1	4

Initial Supporting table - P062B_CSM_ASIC_RAMCorruption_SmplLim

Description: Sample Limit for Controller Status Monitoring - ASIC in case of RAM Corruption: CeFULD_Cnt_RAMCorruptionSmplLim

y/x	1
1	5

Initial Supporting table - P062B_CSM_ASIC_TimeOutReached_FailLim

Description: Fail Limit for Controller Status Monitoring - ASIC in case of TimeOut Reached fail: CeFULD_Cnt_TimeOut_FailLim

y/x	1
1	1

Initial Supporting table - P062B_CSM_ASIC_TimeOutReached_SmplLim

Description: Sample Limit for Controller Status Monitoring - ASIC in case of TimeOut Reached: CeFULD_Cnt_TimeOut_SmplLim

y/x	1
1	2

Initial Supporting table - P06DD_CVDOP_MaxDesPress

Description: The maximum desired pressure, above which the stuck diagnostic will be disabled.

Value Units: Desired oil pressure, kPa
X Unit: Engine oil temperature, °C

y/x	-20	0	20	60	80	100	120	125	130
1	500	450	450	450	450	450	400	350	350

Initial Supporting table - P06DD_CVDOP_MaxPressErr

Description: Error threshold to set the oil pump performance fault.

Value Units: Absolute Oil Pressure Error, kPa
X Unit: Engine Speed, RPM
Y Units: Engine oil temperature, °C

y/x	600	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500
-20	100	100	100	100	100	90	80	70	50
0	88	88	70	60	60	57	54	50	44
20	75	75	50	50	50	50	50	50	50
60	50	50	50	50	50	50	50	50	50
80	50	50	50	50	50	50	50	50	50
100	50	50	50	50	50	50	50	50	50
120	90	90	90	90	90	90	90	90	90
125	100	100	100	100	100	100	100	100	100
130	100	100	100	100	100	100	100	100	100

Initial Supporting table - P06DD_CVDOP_MinDesPres

Description: The minimum desired pressure, below which the stuck diagnostic will be disabled.

Value Units: Desired oil pressure, kPa
X Unit: Engine oil temperature, °C

y/x	-20	0	20	60	80	100	120	125	130
1	180	180	135	135	135	135	135	135	135

Initial Supporting table - P241F: Efficiency Offset

Description: Offset used to correct the computed LP EGR cooler efficiency. It is function of the LP EGR flow.

Value Units: [%]
X Unit: [g/s]

y/x	0	10	20	30	40
1	0	2	4	6	8

Initial Supporting table - P28F7: mimimum torque request

Description: Mimimum torque request to enable Exhaust Pressure Too High monitoring. This map is function of engine speed

Value Units: Nm
X Unit: rpm

y/x	700	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	3,750	4,000	4,500	5,000
1	520	520	520	520	420	320	260	200	140	80	20	20	20	20	20	20

Initial Supporting table - P2B86 Coolant Pump “A” Overspeed Fail Threshold

Description: Pump Overspeed failure threshold as a function of pump requested speed

Value Units: Pump overspeed failure threshold (RPM)
X Unit: Commanded pump speed (RPM)

y/x	0	500	1,000	1,500	2,000	2,500	3,000	3,150	3,350	3,480
1	-200	-200	-200	-200	-200	-250	-300	-315	-335	-348

Initial Supporting table - P2B86 Coolant Pump “A” Overspeed Fail Threshold Low Volatage

Description: Pump Overspeed failure threshold in a low voltage condition as a function of pump requested speed

Value Units: Pump overspeed failure threshold low voltage (RPM)
X Unit: Commanded pump speed (RPM)

y/x	0	500	1,000	1,500	2,000	2,500	3,000	3,150	3,350	3,480
1	-200	-200	-200	-200	-200	-250	-300	-315	-335	-348

Initial Supporting table - PmpPerf: Tabel to estimate the expected pump AC current based on the pump speed.

Description: Tabel to estimate the expected pump AC current based on the pump speed.

Value Units: [A] Expected AC current
X Unit: [rpm] KnlCPD_n_CAC_PumpSpeed

y/x	1,000	2,000	3,000	4,000	5,000	6,000	7,000
-20	0	0	1	3	5	7	10
-10	0	0	1	2	4	7	9
20	0	0	1	2	4	6	9
50	0	0	1	2	3	5	7
128	0	0	1	1	3	5	7

Initial Supporting table - t DerTempDsblTmr

Description: Disabling timer based on the time derivative of SCR average temperature [s] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: s
X Unit: °C/s

y/x	-10	-5	-3	-1	1	3	5	10
1	30	20	10	5	5	10	20	30

Initial Supporting table - t_DerTempDsblTmr_SCR2

Description: Disabling timer based on the time derivative of SCR2 average temperature [s] for SCR2 monitoring (P2C7A)

Value Units: s
X Unit: °C/s

y/x	-10	-5	-3	-1	1	3	5	10
1	25	20	10	5	5	10	20	25

Initial Supporting table - T MaxTempGrad

Description: Upper boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	30	40	50	50	50	50	50	50

Initial Supporting table -T_MaxTempGrad_SCR2

Description: Upper boundary of SCR2 temperature gradient (difference between SCR2 upstream and SCR2 downstream temperature) [°C] for SCR2 monitoring (P2C7A)

Value Units: °C
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	20	20	20	25	25	25	25	25

Initial Supporting table - T MinTempGrad

Description: Lower boundary of SCR temperature gradient (difference between SCR upstream and SCR downstream) [°C] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: °C
X Unit: °C

y/x	200	220	250	280	300	320	350	380
1	-30	-40	-50	-50	-50	-50	-50	-50

Initial Supporting table - T_MinTempGrad_SCR2

Description: Lower boundary of SCR2 temperature gradient (difference between SCR2 upstream and SCR2 downstream temperature) [°C] for SCR2 monitoring (P2C7A)

Value Units: °C
X Unit: °C

y/x	220	250	280	300	320	340	360	380
1	-20	-20	-20	-25	-25	-25	-25	-25

Initial Supporting table - t NOxFlowIncDsblTmr

Description: Debounce time to wait after the NOx flow becomes in range [sec] for SCR NOx catalyst efficiency monitoring (P20EE)

Value Units: sec
X Unit: mg/sec
Y Units: sec

y/x	1	1	2	2	5	6	10
50	2	2	5	5	25	25	30
60	2	2	5	5	25	25	30
70	2	2	5	5	40	40	45
80	2	2	5	5	40	40	45
90	2	2	5	5	40	40	45
100	2	2	5	5	40	40	45
150	2	2	5	5	40	40	45
300	2	2	5	5	40	40	45

Initial Supporting table - Time since last regeneration

Description: Base value to trigger regeneration for time spent since last regeneration, function of regeneration priority

Value Units: s
X Unit: enumerative (mission profiles)

Time since last regeneration - Part 1

y/x	CeDPFC_e_RgnPriority_0	CeDPFC_e_RgnPriority_1	CeDPFC_e_RgnPriority_2	CeDPFC_e_RgnPriority_3	CeDPFC_e_RgnPriority_4	CeDPFC_e_RgnPriority_5
1	86,400	86,400	86,400	86,400	86,400	86,400

Time since last regeneration - Part 2

y/x	CeDPFC_e_RgnPriority_6	CeDPFC_e_RgnPriority_7	CeDPFC_e_RgnPriority_8	CeDPFC_e_RgnPriority_9	CeDPFC_e_RgnPriority_10	CeDPFC_e_RgnPriority_11
1	86,400	86,400	86,400	86,400	86,400	86,400

Time since last regeneration - Part 3

y/x	CeDPFC_e_RgnPriority_12	CeDPFC_e_RgnPriority_13	CeDPFC_e_RgnPriority_14	CeDPFC_e_RgnPriority_15	CeDPFC_e_RgnPriority_16	
1	86,400	86,400	86,400	86,400	86,400	

Initial Supporting table - TimeForOilAeration

Description: The timer limit to declare an engine oil aeration condition exists.

X Unit: Engine oil temperature (deg C)

y/x	-40	-20	0	15	18	19	80	100	120	126	130
1	30	30	30	30	30	30	30	30	30	30	30

Initial Supporting table - errLim

Description:

y/x	1,000	2,000	3,000	4,000	5,000	6,000	7,000
1	750	1,000	1,200	1,400	1,600	1,800	2,000

Initial Supporting table - P0106, P2227, P227B, P1199: Maximum pressure difference

Description: Maximum delta pressure allowed between the three pressure sensors without setting the fault. It is function of the measured airflow.

Value Units: kPa
X Unit: g/s

y/x	5	10	15	16	25	30	35	40
1	13	13	20	22	35	53	70	128

Initial Supporting table - P04DB: Crankcase Pressure Noise Normalization for Engine Speed, high case

Description: Value to normalize the Crankcase Pressure signal noise based on engine speed, high case

Value Units: Scaling Factor for Noise (Unitless)
X Unit: Engine Speed (RPM)
Y Units: None

y/x	1,000	1,200	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - P04DB: Crankcase Pressure Noise Normalization for Engine Speed, low case

Description: Value to normalize the Crankcase Pressure signal noise based on engine speed, low case

Value Units: Scaling Factor for Noise (Unitless)
X Unit: Engine Speed (RPM)
Y Units: None

y/x	1,000	1,200	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - P04DB: Crankcase Pressure Signal Normalization for Air Flow, high case

Description: Value to normalize the Crankcase Pressure signal based on engine air flow, low case

Value Units: Scaling Factor for Signal (Unitless)
X Unit: Engine Air Flow (Grams/Second)
Y Units: None

y/x	10	15	20	25	30	35	40	45	50
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - P04DB: Crankcase Pressure Signal Normalization for Air Flow, low case

Description: Value to normalize the Crankcase Pressure signal based on engine air flow, low case

Value Units: Scaling Factor for Signal (Unitless)
X Unit: Engine Air Flow (Grams/Second)
Y Units: None

y/x	10	15	20	25	30	35	40	45	50
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - PmpSpdDiagDly

Description:

y/x	-20	-10	20	50	128
1	60	20	10	8	5

Initial Supporting table - P0494_LIN_Threshold

Description: Tabulated LIN Fan1 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan1 Speed rpm
Y Units: Sensed LIN Fan1 Speed Lower Limit rpm

y/x	0	625	626	2,140	2,141	2,142	2,143	2,144	2,145	2,146	2,147	2,148	2,149	2,150	2,151	2,152	2,153
1	0	425	425	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940

Initial Supporting table - P2CB9_LIN_Threshold

Description: Tabulated LIN Fan2 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan2 Speed rpm
Y Units: Sensed LIN Fan2 Speed Lower Limit rpm

y/x	0	625	626	2,500	2,501	2,502	2,503	2,504	2,505	2,506	2,507	2,508	2,509	2,510	2,511	2,512	2,513
1	0	425	425	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300

Initial Supporting table - P2CBB_LIN_Threshold

Description: Tabulated LIN Fan3 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan3 Speed rpm
Y Units: Sensed LIN Fan3 Speed Lower Limit rpm

y/x	0	925	926	2,800	2,801	2,802	2,803	2,804	2,805	2,806	2,807	2,808	2,809	2,810	2,811	2,812	2,813
1	0	725	725	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600

Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_EffRgnHysHi

Description:

y/x	5	10	15	20	25	30	35	40	45	50	60	70	90	110	130
0	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
5	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
10	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
15	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
20	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
25	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
30	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
40	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
50	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
60	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
70	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
75	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
80	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
85	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
90	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
95	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
100	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
105	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
110	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	5	10	15	20	25	30	35	40	45	50	60	70	90	110	130
0	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
5	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
10	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
15	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
20	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
25	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
30	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
40	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
50	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
60	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
70	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
75	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
80	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
85	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
90	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
95	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
100	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
105	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
110	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520

Initial Supporting table - DPF ResistFlowDsblHi

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	130	130	130	130	130	130	130	130

Initial Supporting table - DPF ResistFlowDsblLo

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_SootThrshCrtn

Description:

y/x	0	20	40	60	80	100	120	140
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:

y/x	1,000	1,100	1,500	2,500	3,000	3,500	4,000	5,000
1	-5	-5	-5	-5	-5	-5	-5	5

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:

y/x	1,000	1,100	1,500	2,500	3,000	3,500	4,000	5,000
1	-5	-5	-5	-5	-5	-5	-5	5

Initial Supporting table - EGT FuelReqMaxThreshold

Description:

y/x	950	1,000	1,750	2,500	3,000	3,500	4,000	4,500
1	50	50	60	60	60	30	0	0

Initial Supporting table - EGT1 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT1 Dynamic Check.

y/x	0.0	21.0	22.0	40.0	60.0	80.0	120.0
899.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
900.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT1 Fuel request integral

Description:

y/x	-40	-20	0	25	50	75	100	127
1	397,440	388,800	337,152	238,560	230,720	223,440	216,160	207,760

Initial Supporting table - EGT1 Stuck Temperature Variation

Description:

y/x	-40	-8	24	56	88	120	149	150
1	190	158	126	94	62	30	1	0

Initial Supporting table - EGT1 Stuck Wait Time

Description:

y/x	-40	-8	24	56	88	120	149	150
1	460	443	426	409	392	375	359	32,768

Initial Supporting table - EGT2 Fuel request integral

Description:

y/x	-40	-20	0	25	50	75	100	127
1	488,160	476,064	411,648	290,080	280,000	269,920	259,840	249,200

Initial Supporting table - EGT2 Stuck Temperature Variation

Description:

y/x	-40	-8	24	56	88	120	149	150
1	190	158	126	94	62	30	1	0

Initial Supporting table - EGT2 Stuck Wait Time

Description:

y/x	-40	-8	24	56	88	120	149	150
1	565	542	519	496	473	450	429	32,768

Initial Supporting table - EGT3DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT3 Dynamic Check.

y/x	0.0	21.0	22.0	40.0	60.0	80.0	120.0
899.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
900.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3 Fuel request integral

Description:

y/x	-40	-20	0	25	50	75	100	127
1	524,280	524,280	524,280	368,480	347,200	325,920	305,200	282,240

Initial Supporting table - EGT3 Stuck Temperature Variation

Description:

y/x	-40	-8	24	56	88	120	149	150
1	190	158	126	94	62	30	1	0

Initial Supporting table - EnginePointEnable DPF TempDeviation

Description:

y/x	900	1,000	2,000	2,500	3,000	3,010	4,000	4,200
0	0	0	0	0	0	0	0	0
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1
61	1	1	1	1	1	1	1	1

Initial Supporting table - Inrush current profile

Description: This table shows the Inrush current profile to detect a ground short condition

y/x	1	2
1	Time [s]	Irms [A]
2	0	0
3	0	65
4	0	50
5	0	45
6	0	42
7	0	38
8	1	35
9	1	33
10	1	32
11	1	31
12	1	31
13	1	30
14	1	29
15	1	28
16	1	26
17	1	25
18	2	24
19	2	23
20	2	23
21	2	22
22	2	22
23	2	21
24	2	21
25	2	21
26	2	21
27	2	21
28	3	21
29	3	20
30	3	20
31	3	20
32	3	20
33	3	20
34	3	20
35	3	20

Initial Supporting table - Inrush current profile		
36	3	20
37	3	20
38	4	20
39	4	20
40	4	20
41	4	20
42	4	20
43	4	20
44	4	20
45	4	20
46	4	20
47	4	20
48	5	20
49	5	20
50	5	20
51	5	20
52	5	20
53	5	20
54	6	15
55	7	13
56	8	13
57	9	13
58	10	13
59	11	13
60	12	13
61	13	13
62	14	13
63	15	13
64	16	13
65	17	13
66	18	13
67	20	13

Initial Supporting table - KaFADC_b_CB_EnblCMBR

Description: Specifies, for the specific combustion mode, if enable or not CB

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	1

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	1	0

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	3	3	3	3	3	3	3	3	3

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_CBE_DrvlnGrpNotAlwd	CeFADR_e_CBE_DrivelineGrp1	CeFADR_e_CBE_DrivelineGrp2	CeFADR_e_CBE_DrivelineGrp3
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 2

y/x	CeFADR_e_CBE_DrivelineGrp4	CeFADR_e_CBE_DrivelineGrp5	CeFADR_e_CBE_DrivelineGrp6	CeFADR_e_CBE_DrivelineGrp7
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 3

y/x	CeFADR_e_CBE_DrivelineGrp8	CeFADR_e_CBE_DrivelineGrp9	CeFADR_e_CBE_DrivelineGrp10	
1	100	100	100	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: Mpa

y/x	0	1	2	3	4	5
1	3	3	3	3	3	3

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4	5
1	230	121	91	74	20	20

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4	5
1	-163	-85	-77	-62	-20	-20

Initial Supporting table - KaOXYD_b_NOx1LoadChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Full Load condition is enabled

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp
1	1	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_FarInjection	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park
1	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_SCR_ServWarmUp
1	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 5

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	
1	0	0	

Initial Supporting table - KaOXYD_b_NOx1OvrnChkCmbModeEnbl

Description: This array indicates what are the combustion mode in which Plausibility Diagnosis in Overrun condition is enabled

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp
1	1	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_FarInjection	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park
1	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_SCR_ServWarmUp
1	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 5

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	
1	0	0	

Initial Supporting table - KaOXYD_b_NOx1SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp
1	1	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_FarInjection	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park
1	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_SCR_ServWarmUp
1	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	
1	0	0	

Initial Supporting table - KaOXYD_b_NOx2SigRngEnblCmbMode

Description: This array indicates what are the combustion mode in which Signal Range Diagnosis is enabled

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp
1	1	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_FarInjection	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park
1	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_SCR_ServWarmUp
1	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 5

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	
1	0	0	

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	600	700	750	800	850	900	950	1,000	1,100	1,200	1,350	1,500
1	20	20	20	20	20	20	20	20	25	25	25	30

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	70	80	90
1,000	9	10	9	12	14	16	18	20	22	23
1,250	10	11	10	12	14	16	18	20	22	24
1,500	10	11	10	12	14	16	19	21	23	24
1,750	10	11	10	12	14	17	19	21	23	24
2,000	10	11	10	12	14	17	19	21	23	25
2,250	10	11	10	12	15	17	19	21	23	25
2,500	10	11	10	12	15	17	19	21	23	25
2,750	10	11	10	12	15	17	20	21	23	25
3,000	10	11	10	13	15	17	20	21	23	24
3,250	10	11	10	13	15	17	19	21	23	24

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	70	80	90
1,000	-9	-10	-9	-12	-14	-16	-18	-20	-22	-23
1,250	-10	-11	-10	-12	-14	-16	-18	-20	-22	-24
1,500	-10	-11	-10	-12	-14	-16	-19	-21	-23	-24
1,750	-10	-11	-10	-12	-14	-17	-19	-21	-23	-24
2,000	-10	-11	-10	-12	-14	-17	-19	-21	-23	-25
2,250	-10	-11	-10	-12	-15	-17	-19	-21	-23	-25
2,500	-10	-11	-10	-12	-15	-17	-19	-21	-23	-25
2,750	-10	-11	-10	-12	-15	-17	-20	-21	-23	-25
3,000	-10	-11	-10	-13	-15	-17	-20	-21	-23	-24
3,250	-10	-11	-10	-13	-15	-17	-19	-21	-23	-24

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-100	-80	-51	-50	-40	0	40	41	42	80	100
-100	0	0	0	0	0	0	0	0	0	0	0
-51	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
49	0	0	0	100	100	100	100	100	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - KtGLOD_U_VoltLoDelMax(KnGLOD_I_GP_Curr)

Description: Maximum delta voltage table data for low rationality error check.

y/x	0	4	8	12	16	20	24	28
1	5	5	5	5	5	5	5	5

Initial Supporting table - NOX_NOx2SelfTstEnblCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor selt-test monitoring

NOX_NOx2SelfTstEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_NOx2SelfTstEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S1_OfstMntrEnblCmbMode

Description:

NOX_S1_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

NOX_S1_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S1_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor OOR high monitor

NOX_S1_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S1_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	0

NOX_S1_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	1	1	1	0

NOX_S1_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S1_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor OOR low monitor

NOX_S1_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S1_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	0

NOX_S1_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	1	1	1	0

NOX_S1_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S1_PlausChkEnblCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor plausibility

NOX_S1_PlausChkEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S1_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Engine Out NOx Sensor stability monitor

NOX_S1_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

NOX_S1_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S2_OfstMntrEnblCmbMode

Description:

NOX_S2_OfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

NOX_S2_OfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S2_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor OOR high monitor

NOX_S2_OutRngMaxCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S2_OutRngMaxCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	0

NOX_S2_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	1	1	1	0

NOX_S2_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S2_OutRngMinCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor OCR low monitor

NOX_S2_OutRngMinCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	1

NOX_S2_OutRngMinCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	0

NOX_S2_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	1	1	1	0

NOX_S2_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - NOX_S2_StBitChkEnblCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor stability monitor

NOX_S2_StBitChkEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

NOX_S2_StBitChkEnblCmbMode - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - UP Stream Stk Temp Vrtn

Description: Minimum temperature movement to pass the stuck diagnostic.

Value Units: Minimum temperature movement (degC)
X Unit: Upstream Temp sensor temp (degC)

y/x	-40	0	20	40	60	80	100	120
1	3	4	5	5	5	4	3	2

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for DPF

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-12	-7	0	15	30
1	40	30	25	25	25	25

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis High Threshold for others

Description: Hysteresis high threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-12	-7	0	15	30
1	68	28	-10	-10	-10	-10

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for DPF

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation during DPF combustion modes and SCR service warm up combustion mode. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-12	-7	0	15	30
1	38	28	22	22	22	22

Initial Supporting table - AIC_AirCntrlShtOffActn: ECT Too Low Hysteresis Low Threshold for others

Description: Hysteresis low threshold for engine coolant temperature too low shut off condition evaluation. It is function of outside air temperature.

Value Units: °C
X Unit: °C

y/x	-20	-12	-7	0	15	30
1	65	25	-13	-13	-13	-13

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D1 and D3

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during D1 and D3 combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,200	2,000	2,600	3,200	3,800	4,400	5,000
1	26	26	26	26	26	26	26	26

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel High Threshold for D4

Description: Hysteresis high threshold for large injected fuel shut off condition evaluation during D4 combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,200	2,000	2,600	3,200	3,800	4,400	5,000
1	66	66	66	46	46	46	46	46

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D1 and D3

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during D1 and D3 combustion modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,200	2,000	2,600	3,200	3,800	4,400	5,000
1	23	23	23	23	23	23	23	23

Initial Supporting table - AIC_AirCntrlShtOffActn: Fuel Low Threshold for D4

Description: Hysteresis low threshold for large injected fuel shut off condition evaluation during D4 combustion mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	600	1,200	2,000	2,600	3,200	3,800	4,400	5,000
1	63	63	63	43	43	43	43	43

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for 02

Description: Fuel threshold above which the pressure closed loop control is enabled in C2 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	70	40	25	12	12	12	12	12	12	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D1 and D3

Description: Fuel threshold above which the pressure closed loop control is enabled in D1 and D3 modes. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	26	26	26	26	26	26	26	26	26	26	26	26	26

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for D4

Description: Fuel threshold above which the pressure closed loop control is enabled in D4 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	60	60	60	56	56	46	46	46	46	46	46	46	46

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for others

Description: Fuel threshold above which the pressure closed loop control is enabled. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	70	40	25	12	12	12	12	12	12	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: Fuel Request On Threshold for V3

Description: Fuel threshold above which the pressure closed loop control is enabled in V3 mode. It is function of engine speed.

Value Units: mm^3
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	70	40	25	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V1

Description: Threshold above which the pressure closed loop control is enabled in V1 mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

Initial Supporting table - AIC_BstCntrlCL: On Threshold for V2

Description: Threshold above which the pressure closed loop control is enabled in V2 mode. It is function of engine speed.

Value Units: composite
X Unit: rpm

y/x	950	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,750	4,000
1	25	15	12	12	12	12	12	12	12	15	15	15	15

Initial Supporting table - AirCntrlTrnstnEnd: Timer threshold

Description: Timer threshold after which an air control transition is considered as ended. It is function of engine speed.

Value Units: s
X Unit: rpm

y/x	600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000
1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0087 Minimum rail pressure

Description: Minimum rail pressure threshold (MPa) as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	450	500	650	660	800	1,000	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,200	4,400	4,800
1	0	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15

Initial Supporting table - P0089 Maximum rail pressure with MU

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Metering Unit as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,333	2,250	4,000	5,067	6,400
1	68	268	268	268	268	118

Initial Supporting table - P0181 Fuel Temperature Sensor Reference

Description: Defines which sensor is used as reference for check plausibility of fuel temperature sensor.
(CeFTSR_e_ECT_Snsr = Engine coolant temperature, CeFTSR_e_DPF_SnsrUp = Exhaust gas temperature measured upstream the DPF, CeFTSR_e_DPF_SnsrDwn = Exhaust gas temperature measured downstream the DPF.

Value Units: -

y/x	1
1	CeFTSR_e_DPF_SnsrDwn

Initial Supporting table - P0234, P0299: Boost pressure control deviation enabling

Description: Calibration map for the enabling of boost pressure control deviation monitoring, function of combustion mode.

Value Units: boolean

y/x	1
1	1

Initial Supporting table - P0234: Maximum boost pressure for overboost monitor enabling

Description: Maximum desired boost pressure below which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	290	290	296	300

Initial Supporting table - P0234: Minimum boost pressure for overboost monitor enabling

Description: Minimum desired boost pressure above which the overboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	250	250	250	250

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	250	254	257	261	264	268	271	275	278	282	286	289	293	296	300
2,500	-18	-19	-22	-24	-24	-24	-23	-22	-21	-21	-22	-22	-22	-22	-22
2,667	-19	-20	-22	-24	-24	-24	-23	-23	-21	-21	-23	-23	-23	-23	-22
2,833	-22	-22	-23	-25	-24	-24	-23	-23	-21	-21	-24	-24	-24	-24	-22
3,000	-23	-23	-24	-25	-24	-25	-23	-23	-22	-22	-24	-24	-24	-24	-22
3,167	-24	-25	-25	-25	-25	-25	-23	-23	-22	-22	-24	-24	-23	-23	-22
3,333	-24	-26	-26	-25	-25	-25	-23	-23	-22	-22	-23	-23	-23	-22	-22
3,500	-25	-26	-26	-25	-25	-25	-23	-22	-22	-22	-23	-23	-22	-22	-22
3,667	-25	-26	-26	-25	-25	-25	-23	-22	-22	-22	-22	-22	-22	-22	-22
3,833	-27	-28	-27	-26	-25	-25	-24	-22	-22	-22	-22	-22	-22	-22	-22
4,000	-28	-28	-28	-26	-26	-25	-24	-22	-22	-22	-22	-22	-22	-22	-22

Initial Supporting table - P0234: Negative boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the negative boost pressure control deviation monitor when the throttle control is not active. It identifies an overboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	250	254	257	261	264	268	271	275	278	282	286	289	293	296	300
2,500	-18	-19	-22	-24	-24	-24	-23	-22	-21	-21	-22	-22	-22	-22	-22
2,667	-19	-20	-22	-24	-24	-24	-23	-23	-21	-21	-23	-23	-23	-23	-22
2,833	-22	-22	-23	-25	-24	-24	-23	-23	-21	-21	-24	-24	-24	-24	-22
3,000	-23	-23	-24	-25	-24	-25	-23	-23	-22	-22	-24	-24	-24	-24	-22
3,167	-24	-25	-25	-25	-25	-25	-23	-23	-22	-22	-24	-24	-23	-23	-22
3,333	-24	-26	-26	-25	-25	-25	-23	-23	-22	-22	-23	-23	-23	-22	-22
3,500	-25	-26	-26	-25	-25	-25	-23	-22	-22	-22	-23	-23	-22	-22	-22
3,667	-25	-26	-26	-25	-25	-25	-23	-22	-22	-22	-22	-22	-22	-22	-22
3,833	-27	-28	-27	-26	-25	-25	-24	-22	-22	-22	-22	-22	-22	-22	-22
4,000	-28	-28	-28	-26	-26	-25	-24	-22	-22	-22	-22	-22	-22	-22	-22

Initial Supporting table - P0234: Overboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for overboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

Value Units: const [-8, 8]
X Unit: kPa
Y Units: kPa

y/x	250	254	257	261	264	268	271	275	278	282	286	289	293	296	300
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0234: Overboost monitor delay timer

Description: Delay timer before enabling the overboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	2,500	2,667	2,833	3,000	3,167	3,333	3,500	3,667	3,833	4,000
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0299: Maximum boost pressure for underboost monitor enabling

Description: Maximum desired boost pressure below which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	160	160	160	160

Initial Supporting table - P0299: Minimum boost pressure for underboost monitor enabling

Description: Minimum desired boost pressure above which the underboost deviation monitoring is enabled. This map is function of ambient air pressure.

Value Units: kPa
X Unit: kPa

y/x	70	80	90	100
1	126	126	126	126

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	125	127	130	133	135	137	140	143	145	147	150	152	155	157	160
1,300	10	11	14	15	17	17	18	20	21	21	22	23	24	25	26
1,383	10	11	14	15	17	17	18	20	21	21	22	23	24	25	26
1,466	10	11	14	15	17	17	18	20	21	21	22	23	24	25	26
1,550	10	11	14	15	17	17	18	20	21	20	21	22	24	24	25
1,633	10	11	14	15	17	17	18	20	20	19	21	22	23	24	25
1,716	10	11	14	15	17	17	18	20	20	19	20	22	23	24	24
1,800	10	11	14	15	16	16	17	19	19	19	20	21	22	23	24
1,883	10	11	14	15	16	16	17	19	19	19	19	21	22	23	23
1,966	10	11	14	15	16	16	17	19	19	19	19	21	22	23	23
2,050	10	11	14	15	16	16	17	19	19	19	19	21	22	23	23

Initial Supporting table - P0299: Positive boost deviation threshold (throttle control not active)

Description: Boost pressure deviation threshold for the positive boost pressure control deviation monitor when the throttle control is not active. It identifies an underboost faulty condition. It is function of engine speed (Y axis) and desired boost pressure (X axis).

Value Units: kPa
X Unit: kPa
Y Units: rpm

y/x	125	127	130	133	135	137	140	143	145	147	150	152	155	157	160
1,300	10	11	14	15	17	17	18	20	21	21	22	23	24	25	26
1,383	10	11	14	15	17	17	18	20	21	21	22	23	24	25	26
1,466	10	11	14	15	17	17	18	20	21	21	22	23	24	25	26
1,550	10	11	14	15	17	17	18	20	21	20	21	22	24	24	25
1,633	10	11	14	15	17	17	18	20	20	19	21	22	23	24	25
1,716	10	11	14	15	17	17	18	20	20	19	20	22	23	24	24
1,800	10	11	14	15	16	16	17	19	19	19	20	21	22	23	24
1,883	10	11	14	15	16	16	17	19	19	19	19	21	22	23	23
1,966	10	11	14	15	16	16	17	19	19	19	19	21	22	23	23
2,050	10	11	14	15	16	16	17	19	19	19	19	21	22	23	23

Initial Supporting table - P0299: Underboost barometric correction

Description: Ambient air pressure multiplicative correction to the base threshold for underboost monitoring. It is function of ambient air pressure (Y axis) and desired boost pressure (X axis).

Value Units: const [-8, 8]
X Unit: kPa
Y Units: kPa

y/x	250	254	257	261	264	268	271	275	278	282	286	289	293	296	300
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0299: Underboost monitor delay timer

Description: Delay timer before enabling the underboost deviation monitoring once all entry conditions are fulfilled. This map is function of engine speed.

Value Units: s
X Unit: rpm

y/x	1,300	1,383	1,466	1,550	1,633	1,716	1,800	1,883	1,966	2,050
1	2	2	2	1	1	1	1	1	1	1

Initial Supporting table - P0401: Barometric Sea Correction

Description: Insufficient HP EGR flow monitor threshold correction at Sea Level, function of barometric pressure

Value Units: const
X Unit: kPa

y/x	92	94	97	100
1	1	1	1	1

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table A (min level)

Description: Barometric (min level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	-104	-128	-128	-128	-80	-144	-128	-120
5	-112	-208	-208	-208	-168	-208	-192	-184
7	-112	-216	-216	-224	-224	-224	-224	-216
9	-120	-232	-232	-232	-232	-224	-224	-232
11	-128	-232	-232	-232	-232	-224	-240	-248
13	-128	-216	-224	-224	-224	-216	-232	-240
15	-120	-208	-216	-216	-216	-208	-208	-152
17	-128	-192	-208	-200	-208	-184	-160	-88
19	-144	-184	-208	-184	-184	-144	-112	-88

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	-104	-128	-128	-128	-80	-144	-128	-120
5	-112	-208	-208	-208	-168	-208	-192	-184
7	-112	-216	-216	-224	-224	-224	-224	-216
9	-120	-232	-232	-232	-232	-224	-224	-232
11	-128	-232	-232	-232	-232	-224	-240	-248
13	-128	-216	-224	-224	-224	-216	-232	-240
15	-120	-208	-216	-216	-216	-208	-208	-152
17	-128	-192	-208	-200	-208	-184	-160	-88
19	-144	-184	-208	-184	-184	-144	-112	-88

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table B (min level)

Description: Barometric (min level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient HP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	1,125	1,157	1,189	1,221	1,254	1,286	1,318	1,350
3	-104	-128	-128	-128	-80	-144	-128	-120
5	-112	-208	-208	-208	-168	-208	-192	-184
7	-112	-216	-216	-224	-224	-224	-224	-216
9	-120	-232	-232	-232	-232	-224	-224	-232
11	-128	-232	-232	-232	-232	-224	-240	-248
13	-128	-216	-224	-224	-224	-216	-232	-240
15	-120	-208	-216	-216	-216	-208	-208	-152
17	-128	-192	-208	-200	-208	-184	-160	-88
19	-144	-184	-208	-184	-184	-144	-112	-88

Initial Supporting table - P0401: Insufficient HP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	1,100	1,200	1,300	1,400	1,500	1,600	1,650	1,700
64	22	22	22	22	22	22	22	22
68	22	22	22	22	22	22	22	22
72	22	22	22	22	22	22	22	22
76	22	22	22	22	22	22	22	22
80	22	22	22	22	22	22	22	22
84	22	22	22	22	22	22	22	22
88	22	22	22	22	22	22	22	22
92	22	22	22	22	22	22	22	22
96	22	22	22	22	22	22	22	22
100	22	22	22	22	22	22	22	22
104	22	22	22	22	22	22	22	22

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for 0 1

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for 02

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0401: Insufficient HP EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient HP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P0401: Insufficient HP EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	1,100	1,200	1,300	1,400	1,500	1,600	1,650	1,700
64	3	3	3	3	3	3	3	3
68	3	3	3	3	3	3	3	3
72	3	3	3	3	3	3	3	3
76	3	3	3	3	3	3	3	3
80	3	3	3	3	3	3	3	3
84	3	3	3	3	3	3	3	3
88	3	3	3	3	3	3	3	3
92	3	3	3	3	3	3	3	3
96	3	3	3	3	3	3	3	3
100	3	3	3	3	3	3	3	3
104	3	3	3	3	3	3	3	3

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for 02

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P0401: Insufficient HP EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient HP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P0401: Insufficient HP EGR flow temperature correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient HP EGR flow monitor. It is function of ambient air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow temperature correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient HP EGR flow monitor. It is function of ambient air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Insufficient HP EGR flow temperature correction (min level)

Description: Air Temperature correction at min barometric level forOBDII insufficient HP EGR flow monitor. It is function of ambient air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0401: Insufficient HP EGR flow temperature correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient HP EGR flow monitor. It is function of ambient air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-10	-5	0	5	10	20	30	35	40	50
1	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0401: Minimum desired HP EGR flow

Description: Minimum desired HP EGR flow above which the insufficient HP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	1,100	1,200	1,300	1,400	1,500	1,600	1,650	1,700
64	24	24	24	24	24	24	24	24
68	24	24	24	24	24	24	24	24
72	24	24	24	24	24	24	24	24
76	24	24	24	24	24	24	24	24
80	24	24	24	24	24	24	24	24
84	24	24	24	24	24	24	24	24
88	24	24	24	24	24	24	24	24
92	24	24	24	24	24	24	24	24
96	24	24	24	24	24	24	24	24
100	24	24	24	24	24	24	24	24
104	24	24	24	24	24	24	24	24

Initial Supporting table - P0494_LIN_Threshold

Description: Tabulated LIN Fan1 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan1 Speed rpm
Y Units: Sensed LIN Fan1 Speed Lower Limit rpm

y/x	0	625	626	2,140	2,141	2,142	2,143	2,144	2,145	2,146	2,147	2,148	2,149	2,150	2,151	2,152	2,153
1	0	425	425	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940

Initial Supporting table - P049B: Barometric Sea Correction

Description: Insufficient LP EGR flow monitor threshold correction at Sea Level, function of barometric pressure

Value Units: const
X Unit: kPa

y/x	92	94	97	100
1	1	1	1	1

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table A (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table A (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table A (min level)

Description: Barometric (min level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table A (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table B (low level)

Description: Barometric (low level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	-48	-48	-48	-48	-48	-48	-48	-48
14	-48	-48	-48	-48	-48	-48	-48	-48
16	-48	-48	-48	-48	-48	-48	-48	-48
18	-48	-48	-48	-48	-48	-48	-48	-48
20	-48	-48	-48	-48	-48	-48	-48	-48
22	-48	-40	-40	-48	-48	-48	-48	-48
23	-40	-32	-32	-40	-48	-48	-40	-40
25	-32	-24	-24	-32	-40	-40	-32	-24
27	-24	-24	-24	-24	-32	-32	-24	-24

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table B (mid level)

Description: Barometric (mid level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	-48	-48	-48	-48	-48	-48	-48	-48
14	-48	-48	-48	-48	-48	-48	-48	-48
16	-48	-48	-48	-48	-48	-48	-48	-48
18	-48	-48	-48	-48	-48	-48	-48	-48
20	-48	-48	-48	-48	-48	-48	-48	-48
22	-48	-40	-40	-48	-48	-48	-48	-48
23	-40	-32	-32	-40	-48	-48	-40	-40
25	-32	-24	-24	-32	-40	-40	-32	-24
27	-24	-24	-24	-24	-32	-32	-24	-24

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table B (min level)

Description: Barometric (min level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0

Initial Supporting table - P049B: Insufficient LP EGR flow barometric table B (sea level)

Description: Barometric (sea level) calibration table for defining a OBDII threshold for insufficient LP EGR flow deviation monitoring. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: mg
X Unit: rpm
Y Units: mm^3

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
13	-48	-48	-48	-48	-48	-48	-48	-48
14	-48	-48	-48	-48	-48	-48	-48	-48
16	-48	-48	-48	-48	-48	-48	-48	-48
18	-48	-48	-48	-48	-48	-48	-48	-48
20	-48	-48	-48	-48	-48	-48	-48	-48
22	-48	-40	-40	-48	-48	-48	-48	-48
23	-40	-32	-32	-40	-48	-48	-40	-40
25	-32	-24	-24	-32	-40	-40	-32	-24
27	-24	-24	-24	-24	-32	-32	-24	-24

Initial Supporting table - P049B: Insufficient LP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the insufficient LP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
69	0	0	0	0	0	0	0	0
70	0	27	27	27	27	27	27	0
72	0	27	27	27	27	27	27	0
76	0	27	27	27	27	27	27	0
80	0	27	27	27	27	27	27	0
84	0	27	27	27	27	27	27	0
88	0	27	27	27	27	27	27	0
92	0	27	27	27	27	27	27	0
96	0	27	27	27	27	27	27	0
100	0	27	27	27	27	27	27	0
104	0	27	27	27	27	27	27	0

Initial Supporting table - P049B: Insufficient LP EGR flow Max OAT threshold for 01

Description: Maximum desired OAT below which the insufficient LP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	55	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - P049B: Insufficient LP EGR flow Max OAT threshold for 02

Description: Maximum desired OAT below which the insufficient LP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	55	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - P049B: Insufficient LP EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the insufficient LP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	55	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - P049B: Insufficient LP EGR flow Max OAT threshold for V2

Description: Maximum desired OAT below which the insufficient LP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	55	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - P049B: Insufficient LP EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the insufficient LP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
69	100	100	100	100	100	100	100	100
70	100	13	13	13	13	13	13	100
72	100	13	13	13	13	13	13	100
76	100	13	13	13	13	13	13	100
80	100	13	13	13	13	13	13	100
84	100	13	13	13	13	13	13	100
88	100	13	13	13	13	13	13	100
92	100	13	13	13	13	13	13	100
96	100	13	13	13	13	13	13	100
100	100	13	13	13	13	13	13	100
104	100	13	13	13	13	13	13	100

Initial Supporting table - P049B: Insufficient LP EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the insufficient LP EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P049B: Insufficient LP EGR flow Min OAT threshold for 02

Description: Minimum desired OAT above which the insufficient LP EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P049B: Insufficient LP EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the insufficient LP EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P049B: Insufficient LP EGR flow Min OAT threshold for V2

Description: Minimum desired OAT above which the insufficient LP EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	69	70	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P049B: Insufficient LP EGR flow monitor enabling

Description: Calibration map to choose if the insufficient LP EGR flow monitor is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P049B: Insufficient LP EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	0

P049B: Insufficient LP EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

P049B: Insufficient LP EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

P049B: Insufficient LP EGR flow monitor enabling - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - P049B: Insufficient LP EGR flow temperature correction (low level)

Description: Air Temperature correction at low barometric level for OBDII insufficient LP EGR flow monitor. It is function of ambient air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-20	-10	0	10	20	30	40	45	50	55
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P049B: Insufficient LP EGR flow temperature correction (mid level)

Description: Air Temperature correction at mid barometric level for OBDII insufficient LP EGR flow monitor. It is function of ambient air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-20	-10	0	10	20	30	40	45	50	55
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P049B: Insufficient LP EGR flow temperature correction (min level)

Description: Air Temperature correction at min barometric level for OBDII insufficient LP EGR flow monitor. It is function of ambient air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-20	-10	0	10	20	30	40	45	50	55
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P049B: Insufficient LP EGR flow temperature correction (sea level)

Description: Air Temperature correction at sea barometric level for OBDII insufficient LP EGR flow monitor. It is function of ambient air temperature.

Value Units: const [-1,1]
X Unit: °C

y/x	-20	-10	0	10	20	30	40	45	50	55
1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P049B: Minimum desired LP EGR flow

Description: Minimum desired LP EGR flow above which the insufficient LP EGR flow is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mg
X Unit: rpm
Y Units: kPa

y/x	900	1,000	1,200	1,300	1,400	1,500	1,700	1,800
69	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020
70	1,020	80	80	80	80	80	80	1,020
72	1,020	80	80	80	80	80	80	1,020
76	1,020	80	80	80	80	80	80	1,020
80	1,020	80	80	80	80	80	80	1,020
84	1,020	80	80	80	80	80	80	1,020
88	1,020	80	80	80	80	80	80	1,020
92	1,020	80	80	80	80	80	80	1,020
96	1,020	80	80	80	80	80	80	1,020
100	1,020	80	80	80	80	80	80	1,020
104	1,020	80	80	80	80	80	80	1,020

Initial Supporting table - P129F Threshold High

Description: P129F Filtered Fuel Pump Speed Error High Threshold [over-performing motor]
Instantaneously calculated filtered pump speed error measured is higher than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
2,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
3,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
4,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
5,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
6,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0
7,000.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0	-1,125.0

Initial Supporting table - P129F Threshold Low

Description: P129F Filtered Fuel Pump Speed Error Low Threshold [under-performing motor]
Instantaneously calculated filtered pump speed error measured is lower than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
2,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
3,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
4,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
5,000.0	1,125.0	1,125.0	1,125.0	1,125.0	1,125.0
6,000.0	1,750.0	1,750.0	1,750.0	1,750.0	1,750.0
7,000.0	2,750.0	2,750.0	2,750.0	2,750.0	2,750.0

Initial Supporting table - P131F: Excessive EGR flow Max OAT threshold for 0 1

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P131F: Excessive EGR flow Max OAT threshold for 02

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P131F: Excessive EGR flow Max OAT threshold for others

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for all others combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P131F: Excessive EGRflow Max OAT threshold for V2

Description: Maximum desired OAT below which the excessive EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	50	50	50	50	50	50	50	50	50	50	50

Initial Supporting table - P131F: Excessive EGR flow Min OAT threshold for C1

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the C1 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P131F: Excessive EGR flow Min OAT threshold for 02

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the C2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P131F: Excessive EGR flow Min OAT threshold for others

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for all other combustion modes. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P131F: Excessive EGRflow Min OAT threshold for V2

Description: Minimum desired OAT above which the excessive EGR flow is enabled, for the V2 combustion mode. It is function of barometric pressure.

Value Units: °C
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20

Initial Supporting table - P140B, P140C: HP EGR slow response enabling

Description: Calibration map for the enabling of HP EGR slow response monitoring, function of combustion mode.

Value Units: boolean

y/x	1
1	1

Initial Supporting table - P140B: Increasing HP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the increasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	0	0	0	0	0	0	0	0
70	60	60	60	60	60	0	0	0
72	60	60	60	60	60	0	0	0
76	60	60	60	60	60	0	0	0
80	60	60	60	60	60	0	0	0
84	60	60	60	60	60	0	0	0
88	60	60	60	60	60	0	0	0
92	60	60	60	60	60	0	0	0
96	60	60	60	60	60	0	0	0
100	60	60	60	60	60	0	0	0
104	60	60	60	60	60	0	0	0

Initial Supporting table - P140B: Increasing HP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the increasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	70	70	70	70	70	70	70	70
70	0	0	0	0	0	70	70	70
72	0	0	0	0	0	70	70	70
76	0	0	0	0	0	70	70	70
80	0	0	0	0	0	70	70	70
84	0	0	0	0	0	70	70	70
88	0	0	0	0	0	70	70	70
92	0	0	0	0	0	70	70	70
96	0	0	0	0	0	70	70	70
100	0	0	0	0	0	70	70	70
104	0	0	0	0	0	70	70	70

Initial Supporting table - P140B: Increasing HP EGR slow response threshold

Description: Threshold for increasing HP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	72	83	96
1	13	13	13

Initial Supporting table - P140C: Decreasing HP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the decreasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	0	0	0	0	0	0	0	0
70	60	60	60	60	60	0	0	0
72	60	60	60	60	60	0	0	0
76	60	60	60	60	60	0	0	0
80	60	60	60	60	60	0	0	0
84	60	60	60	60	60	0	0	0
88	60	60	60	60	60	0	0	0
92	60	60	60	60	60	0	0	0
96	60	60	60	60	60	0	0	0
100	60	60	60	60	60	0	0	0
104	60	60	60	60	60	0	0	0

Initial Supporting table - P140C: Decreasing HP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the decreasing HP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	70	70	70	70	70	70	70	70
70	0	0	0	0	0	70	70	70
72	0	0	0	0	0	70	70	70
76	0	0	0	0	0	70	70	70
80	0	0	0	0	0	70	70	70
84	0	0	0	0	0	70	70	70
88	0	0	0	0	0	70	70	70
92	0	0	0	0	0	70	70	70
96	0	0	0	0	0	70	70	70
100	0	0	0	0	0	70	70	70
104	0	0	0	0	0	70	70	70

Initial Supporting table - P140C: Decreasing HP EGR slow response threshold

Description: Threshold for decreasing HP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	72	83	96
1	7	7	7

Initial Supporting table - P14A5, P14A6: LP EGR slow response enabling

Description: Calibration map for the enabling of LP EGR slow response monitoring, function of combustion mode.

Value Units: boolean

P14A5, P14A6: LP EGR slow response enabling - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	0

P14A5, P14A6: LP EGR slow response enabling - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

P14A5, P14A6: LP EGR slow response enabling - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

P14A5, P14A6: LP EGR slow response enabling - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - P14A5: Increasing LP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the increasing LP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	10	10	10	10	10	10	10	10
70	90	90	90	90	90	10	10	10
72	90	90	90	90	90	10	10	10
76	90	90	90	90	90	10	10	10
80	90	90	90	90	90	10	10	10
84	90	90	90	90	90	10	10	10
88	90	90	90	90	90	10	10	10
92	90	90	90	90	90	10	10	10
96	90	90	90	90	90	10	10	10
100	90	90	90	90	90	10	10	10
104	90	90	90	90	90	10	10	10

Initial Supporting table - P14A5: Increasing LP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the increasing LP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	50	50	50	50	50	50	50	50
70	10	10	10	10	10	50	50	50
72	10	10	10	10	10	50	50	50
76	10	10	10	10	10	50	50	50
80	10	10	10	10	10	50	50	50
84	10	10	10	10	10	50	50	50
88	10	10	10	10	10	50	50	50
92	10	10	10	10	10	50	50	50
96	10	10	10	10	10	50	50	50
100	10	10	10	10	10	50	50	50
104	10	10	10	10	10	50	50	50

Initial Supporting table - P14A5: Increasing LP EGR slow response threshold

Description: Threshold for increasing LP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	15	15	15

Initial Supporting table - P14A6: Decreasing LP EGR slow response Max fuel enabling condition

Description: Maximum desired fuel below which the decreasing LP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	0	0	0	0	0	0	0	0
70	90	90	90	90	90	0	0	0
72	90	90	90	90	90	0	0	0
76	90	90	90	90	90	0	0	0
80	90	90	90	90	90	0	0	0
84	90	90	90	90	90	0	0	0
88	90	90	90	90	90	0	0	0
92	90	90	90	90	90	0	0	0
96	90	90	90	90	90	0	0	0
100	90	90	90	90	90	0	0	0
104	90	90	90	90	90	0	0	0

Initial Supporting table - P14A6: Decreasing LP EGR slow response Min fuel enabling condition

Description: Minimum desired fuel above which the decreasing LP EGR slow response is enabled. It is function of engine speed (X axis) and barometric pressure (Y axis).

Value Units: mm^3
X Unit: rpm
Y Units: kPa

y/x	950	1,000	1,500	2,000	2,500	3,000	3,500	4,000
68	70	70	70	70	70	70	70	70
70	8	8	8	8	8	70	70	70
72	8	8	8	8	8	70	70	70
76	8	8	8	8	8	70	70	70
80	8	8	8	8	8	70	70	70
84	8	8	8	8	8	70	70	70
88	8	8	8	8	8	70	70	70
92	8	8	8	8	8	70	70	70
96	8	8	8	8	8	70	70	70
100	8	8	8	8	8	70	70	70
104	8	8	8	8	8	70	70	70

Initial Supporting table - P14A6: Decreasing LP EGR slow response threshold

Description: Threshold for decreasing LP EGR flow slow response monitoring. It is function of ambient air pressure.

Value Units: %
X Unit: kPa

y/x	70	83	96
1	17	17	17

Initial Supporting table - P228B Pressure Regulator completely closed command

Description: Command, in terms of pressure (MPa), to consider pressure regulator valve completely closed as function of rail pressure (MPa).

Value Units: MPa
X Unit: MPa

y/x	25	100	200	250
1	50	130	230	275

Initial Supporting table - P2293 Maximum rail pressure with PR

Description: Maximum rail pressure threshold (MPa) when pressure is governed by Pressure Regulator as function of engine speed (rpm).

Value Units: MPa
X Unit: rpm

y/x	0	1,333	2,250	4,000	5,067	6,400
1	68	268	268	268	268	118

Initial Supporting table - P2CB9_LIN_Threshold

Description: Tabulated LIN Fan2 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan2 Speed rpm
Y Units: Sensed LIN Fan2 Speed Lower Limit rpm

y/x	0	625	626	2,500	2,501	2,502	2,503	2,504	2,505	2,506	2,507	2,508	2,509	2,510	2,511	2,512	2,513
1	0	425	425	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300

Initial Supporting table - P2CBB_LIN_Threshold

Description: Tabulated LIN Fan3 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan3 Speed rpm
Y Units: Sensed LIN Fan3 Speed Lower Limit rpm

y/x	0	925	926	2,800	2,801	2,802	2,803	2,804	2,805	2,806	2,807	2,808	2,809	2,810	2,811	2,812	2,813
1	0	725	725	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600

Initial Supporting table - P3187_Threshold

Description: P3187 Filtered Fuel Pressure Error Threshold [under-performing pump]

Value Units: kilo Pascals
X Unit: kPa [commanded fuel pressure]
Y Units: grams / sec [fuel flow]

y/x	200.00	250.00	300.00	350.00	400.00	450.00	500.00	550.00	600.00
0.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
1.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
3.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
4.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
6.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
7.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
9.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
10.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
12.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
13.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
15.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
16.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
18.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
19.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
21.00	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
22.50	40.00	40.00	40.00	40.00	40.00	40.00	130.00	180.00	230.00
24.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
25.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
27.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
28.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
30.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
31.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
33.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
34.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
36.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
37.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
39.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
40.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
42.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
43.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
45.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00

Initial Supporting table - P3187_Threshold

46.50	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00
48.00	40.00	40.00	40.00	40.00	40.00	60.00	130.00	180.00	230.00

Initial Supporting table - P3188_Threshold

Description: P3188 Filtered Fuel Pressure Error Threshold [over-performing pump]

Value Units: kilo pascals [kPa]
X Unit: kPa [commanded fuel pressure]
Y Units: grams/sec [fuel flow]

y/x	200.00	250.00	300.00	350.00	400.00	450.00	500.00	550.00	600.00
0.00	-260.00	-210.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
1.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
3.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
4.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
6.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
7.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
9.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
10.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
12.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
13.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
15.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
16.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
18.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
19.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
21.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
22.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
24.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
25.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
27.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
28.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
30.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
31.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
33.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
34.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
36.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
37.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
39.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
40.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
42.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
43.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
45.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00

Initial Supporting table - P3188_Threshold

46.50	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00
48.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00	-190.00

Initial Supporting table - Rail Pressure Control Configuration

Description: CeFHPG_e_MU_And_PR_ModeSel = pressure control can be governed by both metering unit and pressure regulator
CeFHPG_e_MU = pressure control can be governed by metering unit only
CeFHPG_e_PR = pressure control can be governed by pressure regulator only

Value Units: -

y/x	1
1	CeFHPG_e_MU_And_PR_ModeSel

Initial Supporting table - Rail Pressure Sensor Configuration

Description: Defines which kind of Rail Pressure Sensor configuration is used:
CeFHPG_e_RPS_SingleTrack = RPS with a single rail pressure information
CeFHPG_e_RPS_DoubleTrack = RPS with a redundant rail pressure information

Value Units: -

y/x	1
1	CeFHPG_e_RPS_DoubleTrack

Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - TooHiThreshold

Description:

y/x	0	100	200	300	400	500	600	700	800
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Off

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)

y/x	0.0	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
1.0	0.0	4.0	6.0	6.8	7.3	7.8	8.0	8.0	8.0

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Running

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine running

Value Units: Counter Increment Value (Unitless)
XUnit: Vehicle Speed (KPH)
Y Units: Engine Air Flow (Grams/Second)

y/x	0.0	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
0.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
15.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
25.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
35.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
45.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
55.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
65.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
75.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
85.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5

Initial Supporting table - 1st_FireAftrMisfr_Acel

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	0.86	1.15	1.66	1.50	1.83	2.14	2.44	2.43	2.36	1.96	1.00	1.14	1.36	1.72	0.88	0.58	0.95
6	1.24	1.78	2.65	2.85	2.11	2.45	2.78	2.63	2.40	1.93	1.38	1.17	1.41	1.83	1.00	0.73	1.22
10	1.38	1.97	3.60	3.70	2.94	3.38	3.14	2.83	2.43	1.91	1.50	1.20	1.50	1.94	1.26	1.00	1.47
14	1.08	1.55	2.88	4.27	3.25	3.48	3.87	2.71	2.43	1.84	1.72	1.33	2.00	2.18	1.56	1.33	1.77
18	0.84	1.24	2.69	3.81	3.64	3.55	3.76	2.65	2.34	1.87	1.81	1.59	2.11	2.29	2.00	1.50	2.18
22	0.72	1.07	2.17	3.66	3.85	3.80	3.37	2.44	2.14	1.70	1.52	1.61	2.11	2.41	2.15	1.77	2.40
26	0.61	0.91	1.56	2.93	3.58	3.59	2.52	1.88	2.04	1.63	1.32	1.54	2.00	2.21	1.71	1.67	2.27
40	0.44	0.62	0.86	1.67	1.55	1.63	1.48	1.07	1.41	1.25	0.99	1.17	1.44	1.75	1.31	1.24	1.23
98	0.22	0.30	0.37	0.98	0.86	0.95	0.91	0.57	0.77	0.86	0.69	0.91	1.01	0.79	0.92	0.81	0.54

Initial Supporting table - 1st_FireAftrMisfr_Jerk

Description: Used for P0300 - P0308, Multiplier for establishing the expected Jerk of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	-0.50	-0.22	-0.05	-0.15	0.10	0.57	0.00	-0.35	0.10	-0.04	-0.11	-0.13	-0.04	-0.05	-0.39	-0.35	-0.55
6	-0.55	-0.42	-0.02	-0.10	0.15	0.60	0.05	-0.10	0.05	-0.13	-0.13	-0.08	0.00	-0.05	-0.40	-0.42	-0.67
10	-0.54	-0.46	-0.23	-0.34	-0.01	0.45	-0.05	-0.25	-0.04	-0.24	-0.19	-0.24	-0.39	-0.26	-0.55	-0.63	-0.80
14	-0.45	-0.48	-0.35	-0.41	-0.04	0.40	-0.06	-0.33	-0.23	-0.38	-0.40	-0.33	-0.45	-0.44	-0.52	-0.58	-0.87
18	-0.39	-0.50	-0.41	-0.47	-0.06	0.35	-0.07	-0.39	-0.35	-0.51	-0.56	-0.40	-0.49	-0.59	-0.48	-0.64	-0.72
22	-0.36	-0.50	-0.44	-0.42	-0.06	0.35	-0.07	-0.44	-0.46	-0.60	-0.63	-0.42	-0.51	-0.62	-0.48	-0.82	-0.70
26	-0.35	-0.52	-0.48	-0.40	-0.07	0.35	-0.08	-0.47	-0.56	-0.66	-0.70	-0.46	-0.52	-0.60	-0.56	-0.92	-0.68
40	-0.33	-0.55	-0.54	-0.44	-0.07	0.35	-0.19	-0.50	-0.64	-0.81	-0.76	-0.47	-0.56	-0.67	-0.61	-0.98	-0.57
98	-0.33	-0.57	-0.61	-0.48	-0.08	0.30	-0.36	-0.44	-0.72	-1.00	-0.90	-0.53	-0.57	-0.70	-0.74	-1.14	-0.46

Initial Supporting table - IstFireAfterMisJerkAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected jerk of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - IstFireAftrMisAcelAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - Abnormal Cyl Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2	2	3	2	2	2	2	2	2

Initial Supporting table - Abnormal Rev Mode

Description: Used for P0300-P0308. Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Initial Supporting table - Abnormal SCD Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (SCD Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2	2	2	2	2	2	2	2	2

Initial Supporting table - Bank SCD Decel

Description: Used for P0300 - P0308, Mulitplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
6	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
10	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
12	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
16	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
20	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
98	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

Initial Supporting table - Bank SCD Jerk

Description: Used for P0300 - P0308, Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - BankCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Lores Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	0.96	0.60	0.66	0.71	1.00	1.00	1.00	1.45	1.18	1.26	1.00	1.38	1.55	1.22	1.00	1.00	1.00
6	0.89	0.70	0.81	0.92	0.66	0.78	0.86	1.08	1.00	0.93	1.00	1.09	1.32	1.06	1.00	1.00	1.00
10	0.95	0.88	1.20	1.21	1.20	1.13	0.92	1.03	1.00	0.94	1.00	0.96	1.09	1.00	1.00	1.00	1.00
12	0.77	0.90	1.18	1.33	1.38	1.27	1.00	0.95	1.00	0.94	1.00	0.96	1.00	1.00	1.00	1.00	1.00
16	0.91	0.85	1.30	1.48	1.73	1.21	1.00	1.00	1.00	1.00	1.12	1.09	1.00	1.00	1.00	1.00	1.00
20	0.91	0.87	1.22	1.55	1.97	1.28	0.89	1.04	1.00	1.05	1.10	1.23	1.11	1.00	1.00	1.00	1.00
24	0.91	0.81	1.02	1.44	2.10	1.48	0.70	0.82	1.00	1.04	1.03	1.28	1.25	1.00	0.93	1.00	1.00
30	0.91	0.76	0.81	1.11	1.43	1.17	0.53	0.64	1.00	0.95	1.00	1.23	1.16	1.00	0.95	1.00	0.93
98	1.00	0.67	0.56	0.77	0.71	0.63	0.56	0.57	1.00	0.89	0.73	0.94	0.88	0.55	0.86	0.74	0.78

Initial Supporting table - BankCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	1.00	1.02	1.06	1.00	1.70	2.11	1.69	2.61	1.38	1.54	2.79	2.44	2.33	1.71	1.57	1.43	1.20
6	0.85	0.99	0.70	0.88	0.94	1.06	1.00	1.15	1.05	0.97	1.96	1.42	2.00	1.94	1.50	1.47	1.22
10	0.76	0.71	0.73	0.69	0.69	1.00	1.03	0.96	1.00	1.00	1.11	1.06	1.61	1.30	1.35	1.50	1.33
12	0.80	0.65	0.66	0.72	0.66	0.93	1.00	0.92	0.98	0.88	1.00	1.00	1.12	1.13	1.35	1.41	1.27
16	0.75	0.66	0.58	0.66	0.62	1.00	1.00	0.93	0.92	0.91	1.16	1.00	1.00	0.96	1.08	1.09	1.06
20	0.76	0.65	0.56	0.52	0.55	1.05	1.00	0.94	0.84	0.91	1.13	1.00	1.00	0.87	0.89	1.05	0.95
24	0.80	0.64	0.54	0.42	0.45	1.10	0.95	0.94	0.94	0.88	1.00	1.00	1.00	0.77	0.83	1.00	0.86
30	0.82	0.72	0.61	0.37	0.45	1.02	1.01	1.00	0.91	0.83	1.04	0.97	0.98	0.90	0.71	0.97	0.79
98	1.00	0.87	0.88	0.69	0.60	1.00	1.00	1.00	0.79	0.95	1.00	0.95	1.00	0.88	0.52	1.00	0.75

Initial Supporting table - Catalyst Damage Misfire Percentage

Description: Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

Value Units: percent misfire over 200 revolutions (%)
XUnit: RPM
Y Units: percent load of max indicated torque (%)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
10	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
20	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
30	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
40	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
50	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
60	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
70	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
80	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
90	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
100	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0

Initial Supporting table - CatCrtdEffRepEWMA

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (repass fault threshold) as function of ambient temperature [K] in case of Catalyst EWMA filter enabled and Catalyst conversion inefficiency previously detected (Catalyst FA= TRUE)

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500

Initial Supporting table - CatCrtdEffThrsh

Description: Minimum Catalyst (CC DOC) conversion efficiency threshold (fault threshold) as function of ambient temperature [K]

X Unit: Outside Air Temperature
Y Units: Minimum catalyst efficiency

y/x	250.00	266.00	282.00	298.00	314.00	340.00
1.00	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500

Initial Supporting table - ClyAfterAFM Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ClyBeforeAFM Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CombustModeIdleTbl

Description: Used for P0300 - P0308, Only used on Diesel engines. Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

CombustModeIdleTbl - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - ConsecCylModDecel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	1.18	1.56	1.43	1.53	1.50	2.37	2.16	2.05	2.21	2.15	1.41	1.76	1.55	1.89	1.67	1.38	1.45
6	1.35	1.81	1.76	2.00	1.10	1.41	1.44	1.35	1.49	1.57	1.46	1.39	1.36	1.56	1.55	1.45	1.67
10	1.84	2.00	2.30	2.40	1.90	2.00	1.56	1.55	1.46	1.30	1.31	1.28	1.36	1.50	1.58	1.67	1.80
12	1.87	2.00	1.93	2.35	2.20	2.08	1.87	1.52	1.55	1.23	1.46	1.44	1.65	1.65	1.56	1.71	1.93
16	1.74	2.00	1.50	2.40	2.60	1.97	2.04	1.62	1.57	1.32	1.72	1.70	2.11	1.76	1.87	2.00	2.42
20	1.64	2.00	1.40	2.30	2.80	2.10	1.83	1.66	1.65	1.45	1.90	2.23	2.26	1.88	2.31	2.15	3.10
24	1.43	2.00	1.48	1.90	2.80	2.14	1.40	1.45	1.58	1.48	1.86	2.28	2.50	2.11	2.33	2.21	3.40
30	1.36	2.01	1.33	1.50	1.75	1.45	0.90	1.00	1.38	1.49	1.69	2.45	2.52	2.23	2.40	2.53	2.40
98	0.85	1.39	0.95	0.97	0.70	0.79	0.55	0.72	0.95	1.49	1.66	2.77	3.00	1.64	3.19	1.72	0.88

Initial Supporting table - ConsecCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	-1	0	0	0	0	-1	0	0	0	0	0	0	0	0	0
10	0	0	-1	0	0	0	-1	-1	-1	0	0	0	0	0	0	0	0
12	0	0	-1	-1	0	0	-1	-1	-1	0	-1	0	0	0	0	0	0
16	0	0	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
20	0	0	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
24	0	0	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	0	0
30	0	0	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0
98	0	0	-1	-1	0	0	-1	-1	-1	-1	-1	-1	-1	0	0	-1	0

Initial Supporting table - ConsecSCD Decel

Description: Used for P0300 - P0308, Mulitplier to medres decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ConsecSCD Jerk

Description: Used for P0300 - P0308, Mulitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - CylAfterAFM Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - CylBeforeAFM Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylModeDecel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

CylModeDecel - Part 1

y/x	550	625	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200
2	2,012	1,690	1,123	692	511	404	323	233	160	99	62	46	33
4	2,262	1,657	978	611	419	319	262	203	129	91	61	45	33
6	2,129	1,742	855	539	337	250	206	176	96	83	60	43	32
8	2,206	1,801	714	461	310	209	164	146	83	71	55	40	29
10	2,638	2,000	805	511	311	239	154	132	83	67	47	35	26
12	2,765	2,150	936	618	350	284	176	140	82	68	46	32	26
14	2,873	2,289	1,046	722	402	324	196	144	79	64	47	32	28
16	3,043	2,408	1,185	823	455	367	201	147	86	61	46	34	29
18	3,152	2,480	1,364	927	514	407	213	154	97	58	45	36	30
20	3,237	2,584	1,511	1,030	556	449	244	183	101	59	46	37	30
22	3,355	2,737	1,636	1,136	606	483	269	218	110	61	46	36	31
24	3,492	2,870	1,788	1,234	669	520	329	267	128	79	48	36	33
26	3,663	3,035	1,941	1,318	727	555	380	315	149	95	53	43	35
30	3,965	3,234	2,165	1,498	842	627	484	405	202	126	86	56	55
40	4,727	3,891	2,790	1,919	1,145	834	725	614	329	190	152	90	97
60	6,467	5,205	3,883	2,732	1,701	1,233	1,207	1,010	582	321	274	163	168
97	9,862	7,752	6,035	4,285	2,711	1,921	2,061	1,741	1,040	574	508	321	308

CylModeDecel - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,850	5,500
2	25	20	17	14	16	11	11	9	10	12	13	11	11
4	25	20	17	14	15	11	11	9	10	12	12	10	10
6	25	20	18	15	13	12	11	9	9	11	11	9	9
8	26	19	18	16	13	12	11	9	9	10	10	8	8
10	25	20	19	17	13	13	11	9	8	10	9	8	8
12	23	21	19	18	13	13	10	9	8	9	9	7	7
14	23	23	20	19	13	12	9	9	8	8	8	7	7
16	23	24	21	19	13	12	9	9	8	8	7	6	6
18	26	25	22	20	13	11	9	9	8	7	7	6	6
20	27	25	23	21	15	11	10	9	8	7	7	5	5
22	31	29	26	23	17	12	10	9	8	7	7	5	5

Initial Supporting table - CylModeDecel

24	37	33	28	24	18	13	10	9	9	8	7	5	5
26	45	39	29	26	21	13	11	10	10	9	8	6	6
30	59	54	35	31	24	16	13	11	11	10	9	7	7
40	98	82	49	41	34	21	17	14	15	13	13	11	11
60	168	143	79	60	52	31	25	26	26	19	21	19	19
97	296	259	131	95	86	50	38	48	46	30	34	34	34

Initial Supporting table - CylModeJerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
Y Units: percent load of max indicated torque (%)

CylModeJerk - Part 1

y/x	550	625	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200
2	1,674	1,442	885	584	432	262	245	179	124	74	40	25	19
4	1,752	1,403	904	568	425	281	255	194	129	77	49	34	24
6	1,555	1,299	907	578	407	301	263	208	128	79	57	41	31
8	2,035	1,606	954	670	479	333	260	221	133	94	66	52	35
10	2,461	1,942	1,033	766	541	370	260	233	143	112	77	63	39
12	2,874	2,268	1,164	835	599	429	282	234	157	126	87	75	43
14	3,441	2,440	1,376	913	673	473	335	237	172	138	92	85	46
16	3,047	2,552	1,546	984	750	524	387	262	187	156	98	95	50
18	3,413	2,729	1,697	1,058	811	583	446	310	214	178	108	106	53
20	3,452	2,891	1,861	1,143	891	657	509	400	254	195	120	117	57
22	3,567	3,031	2,012	1,238	951	725	561	466	311	219	131	127	62
24	3,733	3,158	2,150	1,313	1,008	787	610	510	360	247	146	137	70
26	3,786	3,247	2,264	1,380	1,066	857	654	542	405	267	164	152	80
30	4,151	3,399	2,490	1,551	1,205	969	742	622	467	312	195	173	93
40	4,796	3,879	2,981	1,937	1,493	1,255	1,004	827	615	407	269	224	125
60	6,018	4,818	3,830	2,709	2,110	1,831	1,533	1,218	902	601	400	333	184
97	8,514	6,869	5,412	4,177	3,409	2,825	2,422	1,982	1,453	991	672	552	303

CylModeJerk - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,850	5,500
2	16	12	15	12	10	8	12	11	11	12	12	10	10
4	20	17	17	14	11	11	12	10	10	11	11	10	10
6	25	24	19	16	12	13	12	9	9	10	10	9	9
8	27	27	22	18	16	15	12	10	9	10	9	9	9
10	30	29	25	21	19	17	12	12	10	10	8	8	8
12	34	32	29	26	21	18	13	12	12	10	9	8	8
14	39	36	33	30	22	20	15	13	13	12	10	8	8
16	41	40	37	33	23	20	16	13	13	12	11	9	9
18	46	44	42	36	24	22	18	14	13	13	11	9	9
20	49	47	45	39	27	24	20	15	14	14	11	10	10
22	54	50	46	42	30	26	22	17	15	15	11	10	10

Initial Supporting table - CylModeJerk

24	59	54	48	45	32	28	23	20	17	15	12	11	11
26	64	57	50	48	35	30	25	22	20	16	13	11	11
30	70	65	59	53	40	35	28	25	23	19	16	12	12
40	92	89	81	68	55	46	36	32	30	26	21	14	14
60	136	146	126	96	82	67	51	50	46	37	29	18	18
97	221	259	209	151	128	105	79	81	72	56	43	26	26

Initial Supporting table - DeacCylInversionDecel

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't decelerate at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - DeacCylInversionJerk

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't jerk at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

Value Units: RPM
X Unit: Enumeration of transmission gear state (enumeration)

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	5,000	5,000	5,000	5,000	5,000	5,000	5,000

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	5,000	4,100	5,000	4,100	5,000	5,000	

Initial Supporting table - InfrequentRegen

Description: Used for P0300-P0308. Only used on Diesel engines. Initiates a misfire delay when the current combustion mode matchs a selection in the table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

InfrequentRegen - Part 1

y/x	0	1	2	3	4	5
1	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManIRgn	CeCMBR_e_SCR_ServCheck	CeCMBR_i_CombModesMax

InfrequentRegen - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - Number of Normals

Description: Used for P0300-P0308. Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2	2	2	2	2	2	2	2	2

Initial Supporting table - P0101: Manifold pressure High limit in Overrun

Description: Intake manifold pressure high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	700	1,000	2,000	2,500	3,000	4,000	4,500	5,000
1	115	120	125	130	135	140	140	140

Initial Supporting table - P0101: Manifold pressure Low limit in Overrun

Description: Intake manifold pressure low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: kPa
X Unit: rpm

y/x	700	1,000	2,000	2,500	3,000	4,000	4,500	5,000
1	70	70	70	70	70	70	70	70

Initial Supporting table - P0101: Pulsation Map

Description: Adjustment of the air mass flow measured by the MAF sensor for flow distribution and pulsations. It is function of engine speed (X axis) and fuel request (Y axis)

Value Units: const
X Unit: rpm
Y Units: mm^3

y/x	600	850	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250	3,500	3,750	4,000	4,500
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P0101: VGT position High limit in Overrun

Description: VGT position high limit in overrun condition, below which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	700	1,000	2,000	2,500	3,000	4,000	4,500	5,000
1	90	90	90	90	90	90	90	90

Initial Supporting table - P0101: VGT position Low limit in Overrun

Description: VGT position low limit in overrun condition, above which the MAF sensor performance monitoring is enabled. It is function of engine speed.

Value Units: %
X Unit: rpm

y/x	700	1,000	2,000	2,500	3,000	4,000	4,500	5,000
1	5	5	5	5	5	5	5	5

Initial Supporting table - Pair SCD Decel

Description: Used for P0300 - P0308, Mulitplier to SCDJDecel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Pair SCD Jerk

Description: Used for P0300 - P0308, Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - PairCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	0.93	1.01	0.87	1.00	1.29	1.23	1.40	1.38	1.30	1.41	0.97	0.95	0.95	1.17	1.17	0.92	1.23
6	0.88	0.81	0.93	0.96	0.86	0.77	0.90	0.88	0.83	0.87	0.85	0.74	0.77	0.78	1.00	1.00	1.17
10	0.79	0.85	0.92	0.96	1.00	0.96	0.88	0.83	0.78	0.82	0.89	0.88	0.77	0.78	0.89	0.94	1.07
12	0.84	0.92	0.95	1.00	1.00	1.02	0.98	0.83	0.82	0.80	0.88	0.96	0.85	0.88	0.78	0.94	1.07
16	1.00	1.00	1.12	1.00	1.00	0.95	1.07	0.83	0.81	0.95	1.12	1.17	1.06	1.06	0.93	1.07	1.00
20	1.01	1.10	1.30	1.48	1.22	1.13	1.15	0.84	0.93	0.98	1.24	1.41	1.11	1.24	1.23	1.08	1.20
24	1.02	1.12	1.30	1.60	1.57	1.30	1.09	0.78	0.95	0.96	1.28	1.40	1.30	1.39	1.33	1.14	1.40
30	1.03	1.11	1.15	1.34	1.33	1.29	1.08	0.66	0.94	0.97	1.19	1.32	1.28	1.45	1.25	1.35	1.36
98	1.18	1.13	0.87	0.96	1.17	1.00	0.86	0.64	0.90	0.89	0.92	1.06	1.24	1.02	1.42	1.25	1.00

Initial Supporting table - PairCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	2.08	2.06	2.06	2.39	2.50	2.50	3.50	3.74	2.41	2.63	2.40	2.05	1.46	1.15	1.50	1.96	1.60
6	1.81	1.42	1.20	1.69	1.45	1.45	1.71	1.38	1.41	1.50	1.10	1.14	1.29	1.10	1.30	2.00	1.56
10	1.51	1.37	1.30	1.43	1.10	1.10	1.48	1.21	1.14	1.14	1.10	1.12	1.39	1.10	1.30	2.06	1.67
12	1.45	1.46	1.30	1.30	1.10	1.10	1.38	1.16	1.16	1.14	1.05	1.19	1.35	1.15	1.25	1.82	1.60
16	1.26	1.52	1.50	1.35	1.10	1.10	1.27	1.05	1.10	1.15	1.13	1.25	1.25	1.23	1.08	1.23	1.24
20	1.23	1.59	1.63	1.51	1.23	1.00	1.38	1.12	1.10	1.13	1.21	1.21	1.18	1.27	1.26	1.27	1.16
24	1.28	1.62	1.56	1.33	1.19	1.00	1.52	1.26	1.31	1.13	1.28	1.22	1.15	1.15	1.27	1.29	1.24
30	1.29	1.61	1.56	1.35	1.40	1.10	1.78	1.38	1.32	1.17	1.25	1.13	1.09	1.06	1.11	1.42	1.33
98	1.70	1.65	1.37	1.35	1.20	1.27	1.85	1.11	1.16	1.13	1.04	1.00	1.04	0.90	1.19	1.64	1.44

Initial Supporting table - Random SCD Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random SCD Jerk

Description: Used for P0300 - P0308, Mulitplier to Random_SCD_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM Decl

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Decel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM Jerk

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomCylModDecel

Description: Used for P0300 - P0308. Multiplier to CylMode_Decel. account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: Multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.42	1.23	1.23
6	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.05	1.17
10	1.75	1.76	1.90	1.60	1.29	1.65	1.14	1.10	1.35	1.21	1.35	1.20	1.14	1.22	1.05	1.06	1.13
14	1.79	1.90	2.00	2.00	1.71	2.18	1.53	1.27	1.60	1.35	1.72	1.50	1.67	1.53	1.50	1.27	1.23
18	1.64	1.80	2.50	2.50	2.50	2.65	1.86	1.82	1.70	1.54	2.12	2.14	2.17	2.00	2.23	1.64	1.55
22	1.53	1.80	2.50	2.50	3.04	3.00	2.26	2.04	1.88	1.72	2.03	2.52	2.58	2.41	2.69	2.23	2.00
26	1.44	1.85	2.10	2.10	3.32	3.21	1.94	1.95	2.18	1.96	2.05	2.69	2.71	2.63	2.47	2.33	2.18
40	1.31	1.66	1.73	1.93	2.10	1.94	1.48	1.65	2.04	1.86	1.97	2.55	2.38	2.10	2.31	1.96	1.82
98	1.05	1.47	1.20	1.36	1.57	1.47	1.27	1.39	1.87	1.84	1.81	2.59	2.43	1.77	2.25	1.57	1.37

Initial Supporting table - RandomCylModJerk

Description: Used for P0300 - P0308, Multiplier to CylMode_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,800	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,200	4,400	4,850
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.25	1.19	1.00	1.00	1.00	1.00	1.08	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.56	1.20
14	1.31	1.36	1.38	1.19	1.00	1.05	1.13	1.03	1.05	1.00	1.07	1.00	1.03	1.12	1.00	1.26	1.13
18	1.24	1.42	1.41	1.50	1.00	1.16	1.15	1.03	1.02	1.00	1.08	1.02	1.03	1.26	1.04	1.14	1.06
22	1.18	1.38	1.33	1.32	1.06	1.19	1.31	1.09	1.09	1.01	1.03	1.02	1.09	1.21	1.10	1.32	1.05
26	1.17	1.42	1.29	1.21	1.14	1.13	1.35	1.14	1.22	1.02	1.12	1.08	1.12	1.14	1.16	1.35	1.05
40	1.20	1.48	1.27	1.22	1.30	1.26	1.46	1.24	1.16	1.04	1.04	1.00	1.11	1.06	1.02	1.20	1.07
98	1.38	1.47	1.20	1.25	1.36	1.31	1.52	1.08	1.07	1.03	1.02	1.00	1.09	1.00	1.00	1.09	1.02

Initial Supporting table - RandomRevModDecI

Description: Used for P0300 - P0308, Mulitplier to RevMode_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	3,000	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

Description: Used for P0300 - P0308, If misfire is present in consecutive engine cycles, this multiplier is applied to the misfire jerk threshold and compared to a crankshaft snap value after the misfire has taken place.. Table lookup as a function of engine rpm.

Value Units: multiplier
X Unit: RPM

y/x	700	1,100	1,200	1,600	2,200	2,600	3,000	3,400	4,400
1	1.18	1.76	1.94	1.23	1.22	1.37	1.37	1.00	1.00

Initial Supporting table - RevMode Decel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time between revolutions (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,100	3,500	4,000	4,500	5,000	5,500	6,500	7,000
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - Ring Filter

Description: Used for P0300-P0308. Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	5	5	5	5	5	5	5	5	5

Initial Supporting table - SCD_Decel

Description: Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - SCD_Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - SnapDecayAfterMisfire

Description: Used for P0300 - P0308, multiplier times the ddtjerk value used used to detect misfire at that speed and load to see if size of disturbance has died down as expected of real misfire. Table lookup as a function of engine rpm and trans gear ratio.

Value Units: multiplier
X Unit: RPM
Y Units: gear ratio

y/x	700	1,100	1,200	1,600	2,200	2,600	3,000	3,400	4,400
1	3.85	3.85	3.85	3.60	3.80	3.67	3.67	3.67	3.67
1	4.29	4.29	4.29	2.73	3.20	2.65	2.10	2.10	2.10
1	5.00	5.00	5.20	2.90	3.30	3.20	2.20	1.63	1.63
1	3.81	3.81	3.81	3.80	3.50	4.00	2.45	2.02	1.40
2	2.35	2.35	2.60	3.60	3.50	3.80	2.33	2.15	1.82
2	2.74	2.74	3.23	3.41	4.10	3.80	2.90	2.60	1.80
2	2.50	2.47	3.84	2.60	4.30	3.80	2.72	2.75	1.65
3	3.02	3.02	3.15	3.65	3.50	3.30	2.72	2.85	2.30
5	4.27	3.53	3.50	3.20	3.50	3.70	2.54	3.85	2.40

Initial Supporting table - TOSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Rough Road source = TOSS: dispersion value on Transmission Output Speed Sensor above which rough road is indicated present

Value Units: change in rpm per sec (rpm)
X Unit: Engine Speed (RPM)
Y Units: Transmission Speed (RPM)

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
600	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
900	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,500	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,800	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
2,100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
2,400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
2,700	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
3,000	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
3,300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
3,600	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
4,200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Initial Supporting table - WaitToStart

Description: Used for P0300-P0308. Number of engine cycles to delay if diesel engine is cranked before wait to start lamp is extinguished. This lookup table determines the delay length by taking into account the coolant temperature.

Value Units: Number of Engine Cycles (integer)
X Unit: Engine Coolant (deg C)

y/x	-20	-10	0	10	20	30	40	50	60
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - WSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

Value Units: acceleration
X Unit: Vehicle Speed (KPH)

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005	1.05005

Initial Supporting table - ZeroTorqueAFM

Description: Used for P0300-P0308. Zero torque engine load while in Active Fuel Management. %of Max Brake Torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueAFM - Part 1

y/x	550	625	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200
65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ZeroTorqueAFM - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,850	5,500
65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table -ZeroTorqueEngLoad

Description: Used for P0300-P0308. %of Max Brake Torque that represents Zero Brake torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueEngLoad - Part 1

y/x	550	625	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200
65	-0.56	-0.85	-0.93	-0.93	-0.95	-0.85	-1.30	-1.55	-1.76	-2.75	-2.75	-2.81	-3.22
75	-2.34	-1.86	-2.04	-1.92	-1.84	-1.76	-2.11	-2.23	-1.43	-2.77	-2.79	-3.19	-2.81
85	-2.47	-2.12	-2.58	-2.44	-2.39	-2.36	-2.67	-2.74	-1.82	-3.11	-3.25	-3.63	-3.81
95	-1.13	-1.12	-1.18	-1.12	-1.12	-0.93	-1.01	-1.13	-0.42	-1.39	-2.03	-1.89	-1.78
105	-1.13	-1.12	-1.18	-1.12	-1.12	-0.93	-1.01	-1.13	-0.42	-1.39	-2.03	-1.89	-1.78

ZeroTorqueEngLoad - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,850	5,500
65	-3.23	-3.33	-2.24	-1.16	-0.08	1.00	2.09	3.17	4.25	5.33	6.41	8.85	12.37
75	-3.09	-2.87	-2.09	-1.31	-0.52	0.26	1.04	1.82	2.60	3.38	4.16	5.93	8.47
85	-3.96	-4.19	-3.52	-2.85	-2.18	-1.51	-0.84	-0.16	0.51	1.18	1.85	3.36	5.54
95	-1.32	-0.82	0.07	0.97	1.86	2.76	3.66	4.55	5.44	6.34	7.23	9.25	12.16
105	-1.32	-0.82	0.07	0.97	1.86	2.76	3.66	4.55	5.44	6.34	7.23	9.25	12.16

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606 PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	5	5	3

Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:

y/x	0.000	0.010	0.025	0.033	0.050	0.250	0.500	0.750	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

y/x	0.000	0.010	0.025	0.033	0.050	0.250	0.500	0.750	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - DPF_CCB_SootThrsh

Description:

y/x	1,000	1,500	2,000	2,250	2,500	3,000	3,500	4,000	4,500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_EffRgnHysHi

Description:

y/x	5	10	15	20	25	30	35	40	45	50	60	70	90	110	130
0	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
5	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
10	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
15	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
20	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
25	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
30	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
40	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
50	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
60	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
70	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
75	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
80	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
85	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
90	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
95	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
100	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
105	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530
110	530	530	530	530	530	530	530	530	530	530	530	530	530	530	530

Initial Supporting table - DPF_EffRgnHysLo

Description:

y/x	5	10	15	20	25	30	35	40	45	50	60	70	90	110	130
0	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
5	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
10	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
15	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
20	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
25	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
30	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
40	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
50	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
60	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
70	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
75	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
80	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
85	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
90	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
95	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
100	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
105	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520
110	520	520	520	520	520	520	520	520	520	520	520	520	520	520	520

Initial Supporting table - DPF ResistFlowDsblHi

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	130	130	130	130	130	130	130	130

Initial Supporting table - DPF ResistFlowDsblLo

Description:

y/x	600	800	1,200	1,600	2,000	2,400	2,800	3,200
1	0	0	0	0	0	0	0	0

Initial Supporting table - DPF_SootThrshCrtn

Description:

y/x	0	20	40	60	80	100	120	140
1	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_FuelReqHysHiThrsh_DPF

Description:

y/x	1,000	1,100	1,500	2,500	3,000	3,500	4,000	5,000
1	-5	-5	-5	-5	-5	-5	-5	5

Initial Supporting table - EGT_FuelReqHysLoThrsh_DPF

Description:

y/x	1,000	1,100	1,500	2,500	3,000	3,500	4,000	5,000
1	-5	-5	-5	-5	-5	-5	-5	5

Initial Supporting table - EGT FuelReqMaxThreshold

Description:

y/x	950	1,000	1,750	2,500	3,000	3,500	4,000	4,500
1	50	50	60	60	60	30	0	0

Initial Supporting table - EGT1 DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT1 Dynamic Check.

y/x	0.0	21.0	22.0	40.0	60.0	80.0	120.0
899.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
900.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT1 Fuel request integral

Description:

y/x	-40	-20	0	25	50	75	100	127
1	397,440	388,800	337,152	238,560	230,720	223,440	216,160	207,760

Initial Supporting table - EGT1 Stuck Temperature Variation

Description:

y/x	-40	-8	24	56	88	120	149	150
1	190	158	126	94	62	30	1	0

Initial Supporting table - EGT1 Stuck Wait Time

Description:

y/x	-40	-8	24	56	88	120	149	150
1	460	443	426	409	392	375	359	32,768

Initial Supporting table - EGT2 Fuel request integral

Description:

y/x	-40	-20	0	25	50	75	100	127
1	488,160	476,064	411,648	290,080	280,000	269,920	259,840	249,200

Initial Supporting table - EGT2 Stuck Temperature Variation

Description:

y/x	-40	-8	24	56	88	120	149	150
1	190	158	126	94	62	30	1	0

Initial Supporting table - EGT2 Stuck Wait Time

Description:

y/x	-40	-8	24	56	88	120	149	150
1	565	542	519	496	473	450	429	32,768

Initial Supporting table - EGT3DynChk EngPtEnbl

Description: Contains the engine speed and fuel rate enablments for EGT3 Dynamic Check.

y/x	0.0	21.0	22.0	40.0	60.0	80.0	120.0
899.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
900.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
1,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,000.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
2,500.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0
3,200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - EGT3 Fuel request integral

Description:

y/x	-40	-20	0	25	50	75	100	127
1	524,280	524,280	524,280	368,480	347,200	325,920	305,200	282,240

Initial Supporting table - EGT3 Stuck Temperature Variation

Description:

y/x	-40	-8	24	56	88	120	149	150
1	190	158	126	94	62	30	1	0

Initial Supporting table - EnginePointEnable DPF TempDeviation

Description:

y/x	900	1,000	2,000	2,500	3,000	3,010	4,000	4,200
0	0	0	0	0	0	0	0	0
5	0	1	1	1	1	1	1	1
10	0	1	1	1	1	1	1	1
15	0	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1
61	1	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_b_CB_EnblCMBR

Description: Specifies, for the specific combustion mode, if enable or not CB

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	1

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	1	0

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	3	3	3	3	3	3	3	3	3

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_CBE_DrvlnGrpNotAlwd	CeFADR_e_CBE_DrivelineGrp1	CeFADR_e_CBE_DrivelineGrp2	CeFADR_e_CBE_DrivelineGrp3
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 2

y/x	CeFADR_e_CBE_DrivelineGrp4	CeFADR_e_CBE_DrivelineGrp5	CeFADR_e_CBE_DrivelineGrp6	CeFADR_e_CBE_DrivelineGrp7
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 3

y/x	CeFADR_e_CBE_DrivelineGrp8	CeFADR_e_CBE_DrivelineGrp9	CeFADR_e_CBE_DrivelineGrp10	
1	100	100	100	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: MPa

y/x	0	1	2	3	4	5
1	3	3	3	3	3	3

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4	5
1	230	121	91	74	20	20

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4	5
1	-163	-85	-77	-62	-20	-20

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: MPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	600	700	750	800	850	900	950	1,000	1,100	1,200	1,350	1,500
1	20	20	20	20	20	20	20	20	25	25	25	30

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	70	80	90
1,000	9	10	9	12	14	16	18	20	22	23
1,250	10	11	10	12	14	16	18	20	22	24
1,500	10	11	10	12	14	16	19	21	23	24
1,750	10	11	10	12	14	17	19	21	23	24
2,000	10	11	10	12	14	17	19	21	23	25
2,250	10	11	10	12	15	17	19	21	23	25
2,500	10	11	10	12	15	17	19	21	23	25
2,750	10	11	10	12	15	17	20	21	23	25
3,000	10	11	10	13	15	17	20	21	23	24
3,250	10	11	10	13	15	17	19	21	23	24

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	70	80	90
1,000	-9	-10	-9	-12	-14	-16	-18	-20	-22	-23
1,250	-10	-11	-10	-12	-14	-16	-18	-20	-22	-24
1,500	-10	-11	-10	-12	-14	-16	-19	-21	-23	-24
1,750	-10	-11	-10	-12	-14	-17	-19	-21	-23	-24
2,000	-10	-11	-10	-12	-14	-17	-19	-21	-23	-25
2,250	-10	-11	-10	-12	-15	-17	-19	-21	-23	-25
2,500	-10	-11	-10	-12	-15	-17	-19	-21	-23	-25
2,750	-10	-11	-10	-12	-15	-17	-20	-21	-23	-25
3,000	-10	-11	-10	-13	-15	-17	-20	-21	-23	-24
3,250	-10	-11	-10	-13	-15	-17	-19	-21	-23	-24

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-100	-80	-51	-50	-40	0	40	41	42	80	100
-100	0	0	0	0	0	0	0	0	0	0	0
-51	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
49	0	0	0	100	100	100	100	100	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606 PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	5	5	3

Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.699	9.000	9.199	10.000

Initial Supporting table - P16BC_PT Relay Pull-In Run/Crank Voltage f(IAT)

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

Value Units: Run/Crank Voltages required to pull in PT Relay (V)
X Unit: Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.699	9.000	9.199	10.000

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606 PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	5	5	3

Initial Supporting table - P0606 PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	2	2	2	2	3	3	3

Initial Supporting table - P060C CB safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on CB Energizing Time compensation (for each torque forming pulse) as a function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	1,325	481	348	231	186	157	136	122	111	102	95	89	84	79	75	71	68

Initial Supporting table - P060C_EIA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	1,325	481	348	231	186	157	136	122	111	102	95	89	84	79	75	71	68

Initial Supporting table - P060C_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

y/x	-40	-20	-10	0	50	90
500	460	409	389	333	306	307
600	460	409	389	295	268	269
700	422	371	351	257	230	231
750	397	343	328	240	209	207
850	384	333	313	201	173	174
950	358	284	267	181	162	164
1,050	312	241	225	198	170	175
1,150	306	239	223	217	183	184
1,250	322	257	242	239	197	192
1,450	279	231	218	214	175	169
1,650	245	206	194	188	154	151
1,850	112	87	76	67	40	38
2,050	-83	-83	-83	-83	-83	-83
2,500	-91	-91	-91	-91	-91	-91
3,000	-100	-100	-100	-100	-100	-100
3,500	-108	-108	-108	-108	-108	-108
4,000	-116	-116	-116	-116	-116	-116

Initial Supporting table - P060C_Speed Control External Load Max f(Vehicle Speed, RPM)

Description: External load calibration table on the basis of engine speed and vehicle speed

y/x	0	5	8	15	20	30	50
500	200	200	200	200	200	200	200
800	200	200	200	200	200	100	50
1,000	200	200	200	100	100	50	0
1,500	200	200	200	100	-25	-50	-75
2,000	200	200	200	100	-25	-50	-75

Initial Supporting table - P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)

Description: The offset load to add to KtSPDC_M_ExtrenalLoadMaxLmt.

y/x	0	5	8	15	20	30	50
-40	200	200	150	100	75	25	0
-20	100	100	75	50	50	20	0
-10	75	75	50	30	25	15	0
0	50	50	30	20	20	10	0
50	25	25	20	15	10	5	0
90	0	0	0	0	0	0	0

Initial Supporting table - P060C_SQA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on SQA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	13	34	56	77	99	120	142	164	185	207	228	250
1	1,063	446	299	230	191	163	140	127	115	109	103	99

Initial Supporting table - P060C_VCA safety max deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	662	240	174	115	93	79	68	61	56	51	47	45	42	39	38	36	34

Initial Supporting table - P060C_VCA safety min deadband threshold f(Fuel Rail Pressure)

Description: Minimum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	-662	-240	-174	-115	-93	-79	-68	-61	-56	-51	-47	-45	-42	-39	-38	-36	-34

Initial Supporting table - P060C CB safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on CB Energizing Time compensation (for each torque forming pulse) as a function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	1,325	481	348	231	186	157	136	122	111	102	95	89	84	79	75	71	68

Initial Supporting table - P060C_EIA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	1,325	481	348	231	186	157	136	122	111	102	95	89	84	79	75	71	68

Initial Supporting table - P060C_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

y/x	-40	-20	-10	0	50	90
500	460	409	389	333	306	307
600	460	409	389	295	268	269
700	422	371	351	257	230	231
750	397	343	328	240	209	207
850	384	333	313	201	173	174
950	358	284	267	181	162	164
1,050	312	241	225	198	170	175
1,150	306	239	223	217	183	184
1,250	322	257	242	239	197	192
1,450	279	231	218	214	175	169
1,650	245	206	194	188	154	151
1,850	112	87	76	67	40	38
2,050	-83	-83	-83	-83	-83	-83
2,500	-91	-91	-91	-91	-91	-91
3,000	-100	-100	-100	-100	-100	-100
3,500	-108	-108	-108	-108	-108	-108
4,000	-116	-116	-116	-116	-116	-116

Initial Supporting table - P060C_Speed Control External Load Max f(Vehicle Speed, RPM)

Description: External load calibration table on the basis of engine speed and vehicle speed

y/x	0	5	8	15	20	30	50
500	200	200	200	200	200	200	200
800	200	200	200	200	200	100	50
1,000	200	200	200	100	100	50	0
1,500	200	200	200	100	-25	-50	-75
2,000	200	200	200	100	-25	-50	-75

Initial Supporting table - P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)

Description: The offset load to add to KtSPDC_M_ExtrenalLoadMaxLmt.

y/x	0	5	8	15	20	30	50
-40	200	200	150	100	75	25	0
-20	100	100	75	50	50	20	0
-10	75	75	50	30	25	15	0
0	50	50	30	20	20	10	0
50	25	25	20	15	10	5	0
90	0	0	0	0	0	0	0

Initial Supporting table - P060C_SQA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on SQA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	13	34	56	77	99	120	142	164	185	207	228	250
1	1,063	446	299	230	191	163	140	127	115	109	103	99

Initial Supporting table - P060C_VCA safety max deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	662	240	174	115	93	79	68	61	56	51	47	45	42	39	38	36	34

Initial Supporting table - P060C_VCA safety min deadband threshold f(Fuel Rail Pressure)

Description: Minimum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	-662	-240	-174	-115	-93	-79	-68	-61	-56	-51	-47	-45	-42	-39	-38	-36	-34

Initial Supporting table - P060C CB safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on CB Energizing Time compensation (for each torque forming pulse) as a function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	1,325	481	348	231	186	157	136	122	111	102	95	89	84	79	75	71	68

Initial Supporting table - P060C_EIA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	1,325	481	348	231	186	157	136	122	111	102	95	89	84	79	75	71	68

Initial Supporting table - P060C_EIA VSI safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation specific for VSI

P060C_EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 1

y/x	20	30	40	50	60	70
1	500	500	500	500	500	500

P060C_EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 2

y/x	80	90	100	110	120	130
1	500	500	500	500	500	500

P060C EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 3

y/x	140	150	160	170	180	
1	500	500	500	500	500	

Initial Supporting table - P060C IBT safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on IBT Energizing Time compensation as function of Fuel Rail Pressure.

P060CJBT safety deadband threshold f(Fuel Rail Pressure) - Part 1

y/x	20	30	40	50	60	70
1	500	500	500	500	500	500

P060CJBT safety deadband threshold f(Fuel Rail Pressure) - Part 2

y/x	80	90	100	110	120	130
1	500	500	500	500	500	500

P060C IBT safety deadband threshold f(Fuel Rail Pressure) - Part 3

y/x	140	150	160	170	180	
1	500	500	500	500	500	

Initial Supporting table - P060C_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

y/x	-40	-20	-10	0	50	90
500	460	409	389	333	306	307
600	460	409	389	295	268	269
700	422	371	351	257	230	231
750	397	343	328	240	209	207
850	384	333	313	201	173	174
950	358	284	267	181	162	164
1,050	312	241	225	198	170	175
1,150	306	239	223	217	183	184
1,250	322	257	242	239	197	192
1,450	279	231	218	214	175	169
1,650	245	206	194	188	154	151
1,850	112	87	76	67	40	38
2,050	-83	-83	-83	-83	-83	-83
2,500	-91	-91	-91	-91	-91	-91
3,000	-100	-100	-100	-100	-100	-100
3,500	-108	-108	-108	-108	-108	-108
4,000	-116	-116	-116	-116	-116	-116

Initial Supporting table - P060C_Speed Control External Load Max f(Vehicle Speed, RPM)

Description: External load calibration table on the basis of engine speed and vehicle speed

y/x	0	5	8	15	20	30	50
500	200	200	200	200	200	200	200
800	200	200	200	200	200	100	50
1,000	200	200	200	100	100	50	0
1,500	200	200	200	100	-25	-50	-75
2,000	200	200	200	100	-25	-50	-75

Initial Supporting table - P060C_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)

Description: The offset load to add to KtSPDC_M_ExtrenalLoadMaxLmt.

y/x	0	5	8	15	20	30	50
-40	200	200	150	100	75	25	0
-20	100	100	75	50	50	20	0
-10	75	75	50	30	25	15	0
0	50	50	30	20	20	10	0
50	25	25	20	15	10	5	0
90	0	0	0	0	0	0	0

Initial Supporting table - P060C_SQA safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on SQA Energizing Time compensation (for each torque forming pulse) as function of Fuel Rail Pressure.

y/x	13	34	56	77	99	120	142	164	185	207	228	250
1	1,063	446	299	230	191	163	140	127	115	109	103	99

Initial Supporting table - P060C_VCA safety max deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	662	240	174	115	93	79	68	61	56	51	47	45	42	39	38	36	34

Initial Supporting table - P060C_VCA safety min deadband threshold f(Fuel Rail Pressure)

Description: Minimum allowable safety deadband on VCA energizing time correction as function of Fuel Rail Pressure.

y/x	13	27	42	57	72	87	102	116	131	146	161	176	191	205	220	235	250
1	-662	-240	-174	-115	-93	-79	-68	-61	-56	-51	-47	-45	-42	-39	-38	-36	-34

Initial Supporting table - KaFADC_b_SQA_EnblCMBR

Description: SQA combustion mode enable

KaFADC_b_SQA_EnblCMBR - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

KaFADC_b_SQA_EnblCMBR - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

KaFADC_b_SQA_EnblCMBR - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - KaFADC_n_SQC_HiThrsh

Description: Engine speed high threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_HiThrsh - Part 1

y/x	CeFADR_e_CBE_DrvlnGrpNotAlwd	CeFADR_e_CBE_DrivelineGrp1	CeFADR_e_CBE_DrivelineGrp2	CeFADR_e_CBE_DrivelineGrp3
0	1,750	1,750	1,750	1,750
1	1,750	1,750	1,750	1,750
2	1,750	1,750	1,750	1,750
3	1,750	1,750	1,750	1,750
4	1,750	1,750	1,750	1,750
5	1,750	1,750	1,750	1,750

KaFADC_n_SQC_HiThrsh - Part 2

y/x	CeFADR_e_CBE_DrivelineGrp4	CeFADR_e_CBE_DrivelineGrp5	CeFADR_e_CBE_DrivelineGrp6	CeFADR_e_CBE_DrivelineGrp7
0	1,750	1,750	1,750	1,750
1	1,750	1,750	1,750	1,750
2	1,750	1,750	1,750	1,750
3	1,750	1,750	1,750	1,750
4	1,750	1,750	1,750	1,750
5	1,750	1,750	1,750	1,750

KaFADC_n_SQC_HiThrsh - Part 3

y/x	CeFADR_e_CBE_DrivelineGrp8	CeFADR_e_CBE_DrivelineGrp9	CeFADR_e_CBE_DrivelineGrp10	
0	1,750	1,750	1,750	
1	1,750	1,750	1,750	
2	1,750	1,750	1,750	
3	1,750	1,750	1,750	
4	1,750	1,750	1,750	
5	1,750	1,750	1,750	

Initial Supporting table - KaFADC_n_SQC_LoThrsh

Description: Engine speed low threshold for SQC enable function of driveline group and SQA rail pressure level index.

Value Units: Rpm

KaFADC_n_SQC_LoThrsh - Part 1

y/x	CeFADR_e_CBE_DrvlnGrpNotAlwd	CeFADR_e_CBE_DrivelineGrp1	CeFADR_e_CBE_DrivelineGrp2	CeFADR_e_CBE_DrivelineGrp3
0	1,100	1,100	1,100	1,100
1	1,100	1,100	1,100	1,100
2	1,100	1,100	1,100	1,100
3	1,100	1,100	1,100	1,100
4	1,100	1,100	1,100	1,100
5	1,100	1,100	1,100	1,100

KaFADC_n_SQC_LoThrsh - Part 2

y/x	CeFADR_e_CBE_DrivelineGrp4	CeFADR_e_CBE_DrivelineGrp5	CeFADR_e_CBE_DrivelineGrp6	CeFADR_e_CBE_DrivelineGrp7
0	1,100	1,100	1,100	1,100
1	1,100	1,100	1,100	1,100
2	1,100	1,100	1,100	1,100
3	1,100	1,100	1,100	1,100
4	1,100	1,100	1,100	1,100
5	1,100	1,100	1,100	1,100

KaFADC_n_SQC_LoThrsh - Part 3

y/x	CeFADR_e_CBE_DrivelineGrp8	CeFADR_e_CBE_DrivelineGrp9	CeFADR_e_CBE_DrivelineGrp10	
0	1,100	1,100	1,250	
1	1,100	1,100	1,250	
2	1,100	1,100	1,250	
3	1,100	1,100	1,250	
4	1,100	1,100	1,250	
5	1,100	1,100	1,250	

Initial Supporting table - KaFADC_b_CB_EnblCMBR

Description: Specifies, for the specific combustion mode, if enable or not CB

KaFADC_b_CB_EnblCMBR - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	1

KaFADC_b_CB_EnblCMBR - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	1	0

KaFADC_b_CB_EnblCMBR - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

KaFADC_b_CB_EnblCMBR - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - KaFADC_n_CB_EngSpdRngThrsh3

Description: Threshold 3 for engine speed range detection in the Cylinder Balancing (driveline-group dependent) [rpm].

Value Units: rpm

KaFADC_n_CB_EngSpdRngThrsh3 - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100

KaFADC_n_CB_EngSpdRngThrsh3 - Part 2

y/x	11	12	13	14	15	16	17	18	19	20	
1	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	

Initial Supporting table - KaFADC_n_DFSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	3	3	3	3	3	3	3	3	3

Initial Supporting table - KaFADC_n_FSA_EngSpdThrsh

Description: Threshold to evaluate the engine speed steady state, as function of the engaged gear

Value Units: rpm

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - KaFADC_n_SQC_HiThrshDelt

Description: Engine speed high threshold [rpm] delta for SQC actuators enable function of driveline group

Value Units: rpm

KaFADC_n_SQC_HiThrshDelt - Part 1

y/x	CeFADR_e_CBE_DrvlnGrpNotAlwd	CeFADR_e_CBE_DrivelineGrp1	CeFADR_e_CBE_DrivelineGrp2	CeFADR_e_CBE_DrivelineGrp3
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 2

y/x	CeFADR_e_CBE_DrivelineGrp4	CeFADR_e_CBE_DrivelineGrp5	CeFADR_e_CBE_DrivelineGrp6	CeFADR_e_CBE_DrivelineGrp7
1	100	100	100	100

KaFADC_n_SQC_HiThrshDelt - Part 3

y/x	CeFADR_e_CBE_DrivelineGrp8	CeFADR_e_CBE_DrivelineGrp9	CeFADR_e_CBE_DrivelineGrp10	
1	100	100	100	

Initial Supporting table - KaFADC_p_SQA_LrnDelt

Description: Delta Rail Pressure allowed to enable SQA learning [MPa] function of nominal rail pressure setpoint defined for SQA.

Value Units: MPa

y/x	0	1	2	3	4	5
1	3	3	3	3	3	3

Initial Supporting table - KaFADC_t_SQA_MaxAdptDeltET[us]

Description: Upper Energizing time limit for SQA [us] max authority function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4	5
1	230	121	91	74	20	20

Initial Supporting table - KaFADC_t_SQA_MinAdptDeltET[us]

Description: Lower Energizing time limit for SQA max authority [us] function of rail pressure levels defined for SQA.

Value Units: us

y/x	0	1	2	3	4	5
1	-163	-85	-77	-62	-20	-20

Initial Supporting table - KtFADC_p_SQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Strategy function on Rail Pressure levels defined for SQA

Value Units: MPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADC_V_CB_HiThrshFuelQnty

Description: Injected quantity high threshold to enable Cylinder Balancing control [mm^3]

Value Units: mm^3

y/x	600	700	750	800	850	900	950	1,000	1,100	1,200	1,350	1,500
1	20	20	20	20	20	20	20	20	25	25	25	30

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	70	80	90
1,000	9	10	9	12	14	16	18	20	22	23
1,250	10	11	10	12	14	16	18	20	22	24
1,500	10	11	10	12	14	16	19	21	23	24
1,750	10	11	10	12	14	17	19	21	23	24
2,000	10	11	10	12	14	17	19	21	23	25
2,250	10	11	10	12	15	17	19	21	23	25
2,500	10	11	10	12	15	17	19	21	23	25
2,750	10	11	10	12	15	17	20	21	23	25
3,000	10	11	10	13	15	17	20	21	23	24
3,250	10	11	10	13	15	17	19	21	23	24

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3

y/x	5	10	20	30	40	50	60	70	80	90
1,000	-9	-10	-9	-12	-14	-16	-18	-20	-22	-23
1,250	-10	-11	-10	-12	-14	-16	-18	-20	-22	-24
1,500	-10	-11	-10	-12	-14	-16	-19	-21	-23	-24
1,750	-10	-11	-10	-12	-14	-17	-19	-21	-23	-24
2,000	-10	-11	-10	-12	-14	-17	-19	-21	-23	-25
2,250	-10	-11	-10	-12	-15	-17	-19	-21	-23	-25
2,500	-10	-11	-10	-12	-15	-17	-19	-21	-23	-25
2,750	-10	-11	-10	-12	-15	-17	-20	-21	-23	-25
3,000	-10	-11	-10	-13	-15	-17	-20	-21	-23	-24
3,250	-10	-11	-10	-13	-15	-17	-19	-21	-23	-24

Initial Supporting table - KtFADC_V_FSA_MaxFuelFall

Description: Upper bound of fuel quantity range to enable the FSA learning phase depending on the engine speed

Value Units: mm^3

y/x	510	511	1,000	1,600	1,800	2,000	2,400	3,200	3,600	4,000
1	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - KtFADD_p_XSQA_MAP_HiThrsh

Description: Manifold Air Pressure High Threshold [kPa] to disable SQA Emission Correlated Monitoring function on Rail Pressure levels defined for SQA

Value Units: kPa

y/x	1,000	1,200	1,400	1,600	1,800
1	200	200	200	200	200

Initial Supporting table - KtFADD_Pct_SSQA_InjSuspConfLvl

Description: Calibration table to define the suspicious confidence level [%] function of current last raw Delta Energizing Time [us] and previous one [us]

Value Units: %

y/x	-100	-80	-51	-50	-40	0	40	41	42	80	100
-100	0	0	0	0	0	0	0	0	0	0	0
-51	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	100	100	100	100	100	0	0	0
-40	0	0	0	100	100	100	100	100	0	0	0
0	0	0	0	100	100	100	100	100	0	0	0
40	0	0	0	100	100	100	100	100	0	0	0
49	0	0	0	100	100	100	100	100	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - KaFADR_e_FSA_CombModeEnblGrp

Description: Enable FSA learning based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeEnblGrp - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_Warmllp
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 2

y/x	CeCMBR_e_FarInjection	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 3

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_SCR_ServWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 4

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeEnblGrp - Part 5

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KaFADR_e_FSA_CombModeRelGrp

Description: Enable FSA correction release based on the combustion modes and select related maps based on calibrated groups

Value Units: -
X Unit: -

KaFADR_e_FSA_CombModeRelGrp - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_Warmllp
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1

KaFADReFSACombModeRelGrp - Part 2

y/x	CeCMBR_e_FarInjection	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeRelGrp - Part 3

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_SCR_ServWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeRelGrp - Part 4

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_CombModeRelGrp - Part 5

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KaFADR_e_FSA_ECM_CombModeGrp

Description: Enable P026C and P026D in specific combustion modes and select related threshold maps based on calibrated group

Value Units: -
X Unit: -

KaFADR_e_FSA_ECM_CombModeGrp - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_Warmllp
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd

KaFADR e FSA ECM CombModeGrp - Part 2

y/x	CeCMBR_e_FarInjection	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 3

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_SCR_ServWarmUp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 4

y/x	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 5

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich	
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	

Initial Supporting table - KtFADC_V_FSA_FuelMax

Description: Map used to define FSA maximum authority

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	5	10	20	30	40	50	60	70	80	90
1,000	9	10	9	12	14	16	18	20	22	23
1,250	10	11	10	12	14	16	18	20	22	24
1,500	10	11	10	12	14	16	19	21	23	24
1,750	10	11	10	12	14	17	19	21	23	24
2,000	10	11	10	12	14	17	19	21	23	25
2,250	10	11	10	12	15	17	19	21	23	25
2,500	10	11	10	12	15	17	19	21	23	25
2,750	10	11	10	12	15	17	20	21	23	25
3,000	10	11	10	13	15	17	20	21	23	24
3,250	10	11	10	13	15	17	19	21	23	24

Initial Supporting table - KtFADC_V_FSA_FuelMin

Description: Map used to define FSA minimum authority

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	5	10	20	30	40	50	60	70	80	90
1,000	-9	-10	-9	-12	-14	-16	-18	-20	-22	-23
1,250	-10	-11	-10	-12	-14	-16	-18	-20	-22	-24
1,500	-10	-11	-10	-12	-14	-16	-19	-21	-23	-24
1,750	-10	-11	-10	-12	-14	-17	-19	-21	-23	-24
2,000	-10	-11	-10	-12	-14	-17	-19	-21	-23	-25
2,250	-10	-11	-10	-12	-15	-17	-19	-21	-23	-25
2,500	-10	-11	-10	-12	-15	-17	-19	-21	-23	-25
2,750	-10	-11	-10	-12	-15	-17	-20	-21	-23	-25
3,000	-10	-11	-10	-13	-15	-17	-20	-21	-23	-24
3,250	-10	-11	-10	-13	-15	-17	-19	-21	-23	-24

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtHi

Description: Curve of the weighting factor dependent on ambient pressure for P026D

Value Units: -
X Unit: kPa

y/x	72	83	96
1	1	1	1

Initial Supporting table - KtFADD_K_FSA_ECM_PresAmbWghtLo

Description: Curve of the weighting factor dependent on ambient pressure for P026C

Value Units: -
X Unit: kPa

y/x	72	83	96
1	1	1	1

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp1

Description: Map to define P026D threshold for combustion mode Group 1

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	45	50	55	60
1,100	7	7	7	7	7	7	7	7	7	7
1,200	7	7	7	7	7	7	7	7	7	7
1,300	7	7	7	7	7	7	7	7	7	7
1,400	8	8	8	8	7	7	7	7	7	7
1,500	8	8	8	8	7	7	7	7	7	7
1,600	9	8	8	9	7	7	7	7	7	7
1,700	9	9	9	9	8	8	8	8	8	8
1,800	9	8	8	9	8	8	8	8	8	8

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp2

Description: Map to define P026D threshold for combustion mode Group 2

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	45	50	55	60
1,100	9	9	9	9	9	9	9	9	9	9
1,200	9	9	9	9	9	9	9	9	9	9
1,300	9	9	9	9	9	9	9	9	9	9
1,400	9	9	9	9	9	9	9	9	9	9
1,500	9	9	9	9	9	9	9	9	9	9
1,600	9	9	9	9	9	9	9	9	9	9
1,700	9	9	9	9	9	9	9	9	9	9
1,800	9	9	9	9	9	9	9	9	9	9

Initial Supporting table - KtFADD_V_FSA_ECM_HiThrshGrp3

Description: Map to define P026D threshold for combustion mode Group 3

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	45	50	55	60
1,100	9	9	9	9	9	9	9	9	9	9
1,200	9	9	9	9	9	9	9	9	9	9
1,300	9	9	9	9	9	9	9	9	9	9
1,400	9	9	9	9	9	9	9	9	9	9
1,500	9	9	9	9	9	9	9	9	9	9
1,600	9	9	9	9	9	9	9	9	9	9
1,700	9	9	9	9	9	9	9	9	9	9
1,800	9	9	9	9	9	9	9	9	9	9

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp1

Description: Map to define P026C threshold for combustion mode Group 1

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	45	50	55	60
1,100	-6	-5	-5	-5	-6	-7	-7	-7	-7	-7
1,200	-5	-5	-5	-6	-6	-7	-7	-7	-7	-7
1,300	-6	-5	-5	-5	-6	-7	-9	-9	-9	-9
1,400	-5	-5	-5	-6	-6	-7	-8	-8	-8	-8
1,500	-5	-6	-5	-5	-6	-7	-7	-8	-8	-8
1,600	-6	-6	-5	-6	-6	-7	-7	-6	-6	-6
1,700	-6	-7	-7	-6	-7	-7	-8	-9	-9	-9
1,800	-7	-7	-7	-6	-6	-6	-6	-6	-6	-6

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp2

Description: Map to define P026C threshold for combustion mode Group 2

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	45	50	55	60
1,100	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,300	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,500	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,600	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,700	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,800	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - KtFADD_V_FSA_ECM_LoThrshGrp3

Description: Map to define P026C threshold for combustion mode Group 3

Value Units: mm^3
X Unit: mm^3
Y Units: rpm

y/x	15	20	25	30	35	40	45	50	55	60
1,100	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,200	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,300	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,400	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,500	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,600	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,700	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
1,800	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3

Initial Supporting table - P0494_LIN_Threshold

Description: Tabulated LIN Fan1 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan1 Speed rpm
Y Units: Sensed LIN Fan1 Speed Lower Limit rpm

y/x	0	625	626	2,140	2,141	2,142	2,143	2,144	2,145	2,146	2,147	2,148	2,149	2,150	2,151	2,152	2,153
1	0	425	425	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940

Initial Supporting table - P2CB9_LIN_Threshold

Description: Tabulated LIN Fan2 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan2 Speed rpm
Y Units: Sensed LIN Fan2 Speed Lower Limit rpm

y/x	0	625	626	2,500	2,501	2,502	2,503	2,504	2,505	2,506	2,507	2,508	2,509	2,510	2,511	2,512	2,513
1	0	425	425	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300

Initial Supporting table - P2CBB_LIN_Threshold

Description: Tabulated LIN Fan3 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan3 Speed rpm
Y Units: Sensed LIN Fan3 Speed Lower Limit rpm

y/x	0	925	926	2,800	2,801	2,802	2,803	2,804	2,805	2,806	2,807	2,808	2,809	2,810	2,811	2,812	2,813
1	0	725	725	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600

Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - P0494_LIN_Threshold

Description: Tabulated LIN Fan1 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan1 Speed rpm
Y Units: Sensed LIN Fan1 Speed Lower Limit rpm

y/x	0	625	626	2,140	2,141	2,142	2,143	2,144	2,145	2,146	2,147	2,148	2,149	2,150	2,151	2,152	2,153
1	0	425	425	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940

Initial Supporting table - P2CB9_LIN_Threshold

Description: Tabulated LIN Fan2 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan2 Speed rpm
Y Units: Sensed LIN Fan2 Speed Lower Limit rpm

y/x	0	625	626	2,500	2,501	2,502	2,503	2,504	2,505	2,506	2,507	2,508	2,509	2,510	2,511	2,512	2,513
1	0	425	425	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300

Initial Supporting table - P2CBB_LIN_Threshold

Description: Tabulated LIN Fan3 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan3 Speed rpm
Y Units: Sensed LIN Fan3 Speed Lower Limit rpm

y/x	0	925	926	2,800	2,801	2,802	2,803	2,804	2,805	2,806	2,807	2,808	2,809	2,810	2,811	2,812	2,813
1	0	725	725	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600

Initial Supporting table - Shutter 1 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 1 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 1 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 1 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 1 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 1 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 1 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 1 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC OFF - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC OFF

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC OFF - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC OFF Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 2 AC OFF - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC OFF Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - Shutter 2 AC ON - Open / Close Commands

Description: Open / Close Commands for Shutter 2 - AC ON

Value Units: Percent
X Unit: KPH
Y Units: Fan Command Percent

y/x	0	1	2	3	4	5	6	7	8	9
0	0	100	100	100	100	100	100	100	100	100
1	0	100	100	100	100	100	100	100	100	100
2	0	100	100	100	100	100	100	100	100	100
3	0	100	100	100	100	100	100	100	100	100
4	0	100	100	100	100	100	100	100	100	100
5	0	95	95	95	95	95	95	95	95	95
6	0	90	90	90	90	90	90	90	90	90
7	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - Shutter 2 AC ON - Percent Fan Command Axis

Description: Percent Fan Command Axis for Shutter 2 - AC ON Table

Value Units: Percent

y/x	1	2	3	4	5	6	7	8	9	10
1	4	8	14	17	18	20	22	24	83	90

Initial Supporting table - Shutter 2 AC ON - Vehicle Speed Axis

Description: Vehicle Speed Axis for Shutter 2 - AC ON Table

Value Units: KPH

y/x	1	2	3	4	5	6	7	8	9	10
1	0	55	70	95	110	120	140	150	180	200

Initial Supporting table - P0494_LIN_Threshold

Description: Tabulated LIN Fan1 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan1 Speed rpm
Y Units: Sensed LIN Fan1 Speed Lower Limit rpm

y/x	0	625	626	2,140	2,141	2,142	2,143	2,144	2,145	2,146	2,147	2,148	2,149	2,150	2,151	2,152	2,153
1	0	425	425	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940

Initial Supporting table - P2CB9_LIN_Threshold

Description: Tabulated LIN Fan2 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan2 Speed rpm
Y Units: Sensed LIN Fan2 Speed Lower Limit rpm

y/x	0	625	626	2,500	2,501	2,502	2,503	2,504	2,505	2,506	2,507	2,508	2,509	2,510	2,511	2,512	2,513
1	0	425	425	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300

Initial Supporting table - P2CBB_LIN_Threshold

Description: Tabulated LIN Fan3 Speed Low Limits

Value Units: rpm
X Unit: Commanded LIN Fan3 Speed rpm
Y Units: Sensed LIN Fan3 Speed Lower Limit rpm

y/x	0	925	926	2,800	2,801	2,802	2,803	2,804	2,805	2,806	2,807	2,808	2,809	2,810	2,811	2,812	2,813
1	0	725	725	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600

Initial Supporting table - P0216_ET_CumulEnbl

Description: This calibration provides the capability to select which pulses of the injection pattern have to be monitored
1 -> pulse monitored
0 -> pulse NOT monitored

Value Units: Boolean
X Unit: Pulse ID

P0216_ET_CumulEnbl - Part 1

y/x	CeFULR_e_PulsPI	CeFULR_e_PulsR2	CeFULR_e_PulsR1	CeFULR_e_PulsM1	CeFULR_e_PulsM	CeFULR_e_PulsA1	CeFULR_e_PulsA2
1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00

P0216_ET_CumulEnbl - Part 2

y/x	CeFULR_e_PulsA3	CeFULR_e_PulsA4	CeFULR_e_PulsP1	CeFULR_e_PulsP2	CeFULR_e_PulsP3	CeFULR_e_PulsP4	CeFULR_e_PulsP5
1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - P0216_PulsWidthErrHi

Description: This error threshold map defines the maximum acceptable positive error [us] between cumulative ET HW and ET SW, depending on the number of pulses driven and monitored.

Value Units: us
X Unit: -
Y Units: Number of pulses

y/x	0.00	1.00	2.00	3.00	4.00	5.00
1.00	32,767.00	14.00	14.00	18.00	22.00	40.00

Initial Supporting table - P054E_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054E_IFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_Warmllp	CeCMBR_e_FarInjection
1	1	0	1	1

P054E_IFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	0	0

P054E_IFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

P054E_IFM_CombModesEnbl - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - P054EJFM_MinFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	15	15	15	17	20
-10	11	11	11	15	18
0	10	10	10	13	17
20	9	9	9	11	12
40	6	6	6	9	13
70	5	5	5	8	11

Initial Supporting table - P054E_IFM_MinFuelIdleC1_PN

Description: During Normal combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	10	10	10	11	12
-10	9	9	9	8	10
0	8	8	8	8	9
20	4	4	4	5	5
40	4	4	4	4	4
70	2	2	2	2	3

Initial Supporting table - P054EJFM_MinFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	16	16	16	18	19
-10	13	13	13	15	17
0	9	9	9	12	15
20	8	8	8	11	13
40	7	7	7	12	16
70	5	5	5	9	13

Initial Supporting table - P054E zJFM_MinFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	14	14	14	15	16
-10	11	11	11	11	13
0	8	8	8	10	11
20	7	7	7	8	9
40	4	4	4	5	5
70	3	3	3	3	4

Initial Supporting table - P054E_IFM_MinFuelIdleV2_G

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	4	4	4	4	4
-10	2	2	2	2	2
0	9	9	9	2	2
20	8	8	8	10	13
40	7	7	7	10	14
70	5	5	5	8	11

Initial Supporting table - P054E EJFM_MinFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	4	4	4	4	4
-10	2	2	2	2	2
0	6	6	6	7	7
20	5	5	5	5	6
40	4	4	4	4	5
70	2	2	2	3	3

Initial Supporting table - P054E_IFM_MinFuelIdleV3_G

Description: During Strong Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	18	18	18	21	25
-10	14	14	14	19	24
0	10	10	10	14	22
20	7	7	7	10	13
40	6	6	6	9	12
70	5	5	5	8	11

Initial Supporting table - P054E EJFM_MinFuelIdleV3_PN

Description: During Strong Warm Up combustion mode, this error threshold map indicates the minimum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	21	21	21	20	21
-10	13	13	13	15	16
0	9	9	9	10	11
20	5	5	5	5	5
40	4	4	4	4	4
70	1	3	3	3	3

Initial Supporting table - P054F_IFM_CombModesEnbl

Description: This calibration provides the capability to select in which combustion mode the Idle Fuel Monitoring shall be enabled.
1 -> monitor enabled
0 -> monitor disabled

Value Units: Boolean
X Unit: Combustion Mode

P054F_IFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_Warmllp	CeCMBR_e_FarInjection
1	1	0	1	1

P054F_IFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_HCS_DeHC_Drive	CeCMBR_e_HCS_DeHC_Park	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	0	0

P054F_IFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_ExhOvrtemp	CeCMBR_e_LNT_DeNOx
1	0	0	0	0

P054F_IFM_CombModesEnbl - Part 4

y/x	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0		

Initial Supporting table - P054F_IFM_MaxFuelIdleC1_G

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	34	34	34	41	44
-10	25	25	25	28	35
0	24	24	24	32	35
20	23	23	23	25	32
40	22	22	22	26	31
70	20	20	20	20	20

Initial Supporting table - P054F-JFM_MaxFuelIdleC1_PN

Description: During Normal combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	31	31	31	31	35
-10	29	29	29	30	31
0	25	25	25	25	26
20	23	23	23	22	20
40	21	21	21	20	19
70	19	19	19	18	17

Initial Supporting table - P054FJFM_MaxFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	27	27	27	33	37
-10	26	26	26	32	36
0	25	25	25	30	35
20	24	24	24	28	33
40	19	19	19	26	32
70	18	18	18	24	30

Initial Supporting table - P054F_IFM_MaxFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	37	37	37	38	40
-10	32	32	32	34	35
0	27	27	27	29	30
20	22	22	22	24	25
40	21	21	21	22	24
70	17	17	19	19	20

Initial Supporting table - P054FJFM_MaxFuelIdleV2_G

Description: During Soft Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	60	60	60	60	60
-10	60	60	60	60	60
0	60	60	60	60	60
20	17	17	17	20	24
40	13	13	13	17	21
70	13	13	13	17	20

Initial Supporting table - P054F FJFM_MaxFuelIdleV2_PN

Description: During Soft Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	60	60	60	60	60
-10	60	60	60	60	60
0	60	60	60	60	60
20	13	13	13	14	15
40	12	12	12	12	13
70	11	11	11	11	12

Initial Supporting table - P054FJFM_MaxFuelIdleV3_G

Description: During Strong Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in gear. It's function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	45	45	45	46	54
-10	41	41	41	42	52
0	35	35	35	40	48
20	28	28	28	37	45
40	27	27	27	33	39
70	35	35	35	38	47

Initial Supporting table - P054F FJM_MaxFuelIdleV3_PN

Description: During Strong Warm Up combustion mode, this error threshold map indicates the maximum fuel requested [mm3] in nominal condition and with transmission in park and neutral. It’s function of engine coolant temperature [°C] and engine speed [rpm]

Value Units: mm3
X Unit: rpm
Y Units: °C

y/x	0	400	800	1,000	1,200
-20	40	40	40	42	43
-10	29	29	29	34	39
0	26	26	26	32	33
20	23	23	23	28	31
40	21	21	21	25	29
70	19	19	19	22	24

Initial Supporting table - RufCyl Decel

Description: Used for P0300-P0308. Crankshaft decel threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Decel - Part 1

y/x	550	625	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200
2	1,854	1,690	1,235	692	511	404	323	233	160	103	76	61	49
4	1,931	1,657	1,061	611	419	319	262	203	129	91	69	53	41
6	1,895	1,742	855	539	337	250	206	176	96	83	62	47	35
8	2,206	1,801	714	461	310	209	164	135	83	71	53	41	30
10	2,638	2,000	805	511	320	239	154	132	83	67	45	31	23
12	2,765	2,150	936	696	392	299	176	140	82	68	45	32	24
14	2,873	2,289	1,025	846	451	355	196	144	79	64	47	32	25
16	3,043	2,408	1,185	960	504	390	201	147	86	61	46	35	28
18	3,152	2,480	1,408	1,023	534	432	213	154	97	58	45	35	27
20	3,237	2,584	1,511	1,067	556	466	244	183	101	59	48	37	29
22	3,355	2,737	1,636	1,136	606	492	269	218	110	61	43	36	30
24	3,492	2,870	1,788	1,234	669	520	329	267	128	79	46	35	34
26	3,663	3,035	1,941	1,318	727	559	380	315	149	95	53	39	35
30	3,965	3,234	2,165	1,462	842	627	484	405	202	126	86	56	55
40	4,727	3,891	2,790	1,919	1,145	834	725	614	329	190	152	90	97
60	6,467	5,205	3,883	2,732	1,724	1,233	1,207	1,010	582	321	274	163	168
97	9,862	7,752	6,035	4,285	2,711	1,921	2,061	1,741	1,040	574	508	321	308

RufCyl_Decel - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,850	5,500
2	35	27	31	21	22	20	20	17	16	15	16	13	13
4	32	24	26	18	18	18	18	15	14	13	14	12	12
6	29	21	22	15	16	15	15	13	13	12	12	10	10
8	27	19	20	16	14	14	14	12	11	11	11	9	9
10	19	18	17	16	12	12	12	11	10	10	9	8	8
12	17	18	17	14	12	11	9	9	9	10	9	7	7
14	17	16	14	12	10	10	9	8	8	9	7	7	7
16	15	16	15	12	10	10	8	7	7	8	7	6	6
18	19	17	16	12	12	10	8	7	7	7	7	6	6
20	20	20	17	14	12	10	9	7	7	7	7	5	5
22	28	23	21	19	16	11	9	8	7	7	7	5	5

Initial Supporting table - RufCyl Decel

24	35	30	24	23	18	12	10	9	8	7	7	5	5
26	44	39	29	26	21	13	11	10	10	9	8	6	6
30	59	54	36	31	24	16	13	11	11	11	9	7	7
40	98	82	49	41	34	21	17	14	14	13	13	11	11
60	168	143	79	60	52	31	25	20	19	19	21	19	19
97	296	259	131	95	86	50	38	31	29	30	34	34	34

Initial Supporting table - RufCyl Jerk

Description: Crankshaft jerk threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Jerk - Part 1

y/x	550	625	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200
2	1,613	1,442	1,066	584	505	299	273	215	161	90	58	54	45
4	1,622	1,403	998	568	445	281	264	204	141	83	56	50	39
6	1,555	1,299	930	578	407	301	263	208	128	80	57	46	32
8	1,842	1,606	944	663	422	314	260	221	133	95	66	54	36
10	2,170	1,942	968	715	429	326	247	233	131	115	77	60	39
12	2,529	2,268	1,164	816	560	351	276	194	157	126	87	62	39
14	2,685	2,440	1,376	881	673	396	349	186	172	128	92	66	42
16	2,796	2,552	1,546	947	750	464	387	238	176	142	98	79	44
18	2,925	2,729	1,697	1,058	811	558	467	305	188	169	98	90	48
20	3,320	2,891	1,861	1,143	891	657	509	400	254	195	101	104	55
22	3,465	3,031	2,012	1,254	951	725	566	466	311	219	110	127	62
24	3,733	3,158	2,150	1,313	1,008	787	626	510	360	247	130	143	70
26	3,786	3,247	2,264	1,380	1,066	857	666	542	405	260	154	155	80
30	4,151	3,399	2,490	1,551	1,205	969	742	622	467	312	195	173	93
40	4,796	3,879	2,981	1,937	1,493	1,255	1,004	827	615	407	269	224	125
60	6,018	4,818	3,830	2,709	2,110	1,831	1,545	1,218	902	601	400	333	184
97	8,514	6,869	5,412	4,177	3,409	2,825	2,422	1,982	1,453	991	672	552	313

RufCyl_Jerk - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,850	5,500
2	45	36	34	26	25	32	22	17	18	17	17	12	12
4	35	27	28	22	20	26	19	14	15	14	15	11	11
6	27	20	23	18	15	21	16	12	12	12	13	10	10
8	28	24	24	20	16	14	12	12	11	11	12	9	9
10	29	26	24	21	17	15	13	13	11	10	10	8	8
12	28	26	27	22	19	16	14	13	12	11	10	8	8
14	29	26	28	24	21	17	15	13	13	12	10	8	8
16	29	30	27	29	22	19	16	13	13	12	11	8	8
18	31	32	26	31	23	21	18	13	13	13	11	9	9
20	35	33	28	33	25	24	20	14	13	14	11	10	10
22	38	40	34	36	29	26	23	17	14	15	11	10	10

Initial Supporting table - RufCyl Jerk

24	40	42	40	40	32	27	25	20	17	15	11	11	11
26	43	46	46	43	35	30	28	21	20	16	13	11	11
30	56	58	56	50	40	35	31	25	23	19	16	12	12
40	84	89	81	66	55	46	39	33	31	26	21	14	14
60	136	146	126	96	82	67	52	47	44	37	29	18	18
97	221	259	209	150	128	105	79	72	69	56	44	26	26

Initial Supporting table - RufSCDDecel

Description: Used for P0300-P0308. Crankshaft decel threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts, (especially decel and jerk thresholds since they track actual air trapped in cylinder)

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Decel - Part 1

y/x	550	625	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Decel - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,850	5,500
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Decel

20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCDJerk

Description: Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Jerk - Part 1

y/x	550	625	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Jerk - Part 2

y/x	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,850	5,500
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

Description: Crankshaft Indicated Mean Effective Pressure (IMEP) Estimate that below which will be considered misfire. Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load region or "bin". Each Bin has has its own "BinID". This BinID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table.
The BinID table's Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

Value Units: KPa
XUnit: BinID

Misfire_IMEP_Thresh_vs_BinID - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 2

y/x	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 3

y/x	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 4

y/x	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 5

y/x	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 6

y/x	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 7

y/x	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 8

y/x	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Misfire_IMEP_Thresh_vs_BinID - Part 9

y/x	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

1	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255	-255

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
GPS Signal Not Plausible	B1B44	Monitors if the recieved GPS location is plausible. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have be satisfied AND The values within the Redundant GPS Array do not exactly match a sample within the Primary GPS Array	If the primary measurement for the following signals do not match the redundant version of these below signals: -Lower Global Time Stamp -Heading -Elevation -Longitude -Latitude -Signal Acquisition Time -Calendar Year -Calendar Day -Time of Day -Mode -2D Absolute Position Error Estimate -Absolute Heading Error Estimate -Location Usable	Primary Precise Positioning System Data Group Communication Fault Active Redundant Precise Positioning System Data Burst Group Communication Fault Active Primary Precise Positioning System Data Group Data Recieved value changed from the previous excecution cycle Diagnostic System Disabled is FALSE Vehicle Power Mode K_Integrity_Diagnostic_Enable is TRUE	= FALSE = FALSE = FALSE = ACCESSORY, RUN or PROPULSION = TRUE	Continous	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
GPS Signal - Vehicle Speed not Plausible	B1B46	Monitors if the recieved GPS speed is plausible. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have be satisfied AND There is a difference between the host vehicle GNSS calculated vehicle speed, and the vehicle speed calculated via the vehicle wheel speed sensors	abs(host vehicle GNSS calculated vehicle speed - the vehicle speed calculated via the vehicle wheel speed sensors) > K_LimitThreahold	Diagnostic System Disabled Vehicle Power Mode Primary Precise Positioning System Mode Primary Precise Positioning System Location Usable Primary Precise Positioning System Data Group Communication Fault Active Primary Precise Positioning System Data Group Data Recieved GPS Time Drift Diagnostic Fault Active GPS Integrity Diagnostic Fault Active Host Vehicle Velocity Invalidity Host Vehicle Yaw Rate Invalidity is FALSE	= FALSE = ACCESSORY, RUN or PROPULSION = GNSS and RTX and DR, or GNSS and RTX and DR and MM = TRUE = FALSE = TRUE = FALSE = FALSE = FALSE = FALSE	Continous	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor	C0061	Monitors for faults of the High Performance IMU Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND HP IMU Lateral Acceleration Correlation Status is Unknown or Not Correlated	HP IMU Lateral Acceleration Correlation Status is Unknown or Not Correlated	K_Communications_Fault_Pending HP IMU Lateral Acceleration Correlation Status Loss of Communication Fault Active HP IMU Lateral Acceleration Correlation Status Failed Safety Fault Active HP IMU Lateral Acceleration Correlation Status Availability Indication HP IMU Lateral Acceleration Correlation Status Failed Safety Indication HP IMU Common Diagnostic Enable Lateral Acceleration Correlation Diagnostic Communication Enable HP IMU Signal Diagnostic Enable Manufactures Enable Counter (MEC) K_Lateral_Acceleration_Diagnostic_Enable	= FALSE = FALSE = FALSE = Available = FALSE = TRUE = TRUE = TRUE = 0 =TRUE	Continous	Safety Emissions Neutral Diagnostics - Special Type C
			The diagnostic sub function shall record a	▪HP IMU Primary Lateral Acceleration	K_Communications_Fault -Pending	= FALSE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			failure if all of the following conditions are met: The Enable Criteria have been satisfied AND any of the following are True: ■HPIMU Primary Lateral Acceleration Invalidity is Determined Invalid ■HPIMU Secondary Lateral Acceleration Invalidity is Determined Invalid	Invalidity is Determined Invalid OR HP IMU Secondary Lateral Acceleration Invalidity is Determined Invalid	HP IMU Primary Lateral Acceleration Loss of Communication Fault Active HP IMU Primary Lateral Acceleration Availability Indication HP IMU Primary Lateral Acceleration Failed Safety Fault Active HP IMU Primary Lateral Acceleration Failed Safety Indication HP IMU Secondary Lateral Acceleration Loss of Communication Fault Active HP IMU Secondary Lateral Acceleration Availability Indication HP IMU Secondary Lateral Acceleration Failed Safety Fault Active HP IMU Secondary Lateral Acceleration Failed Safety Indication HP IMU Common Diagnostic Enable HP IMU Signal Diagnostic Enable Lateral Acceleration	= FALSE = Available = FALSE = FALSE = FALSE =Available = FALSE = FALSE =TRUE =TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Invalid Diagnostic Communication Enable	=TRUE		
					Manufactures Enable Counter (MEC)	=0		
					K_Lateral_Acceleration_Diagnostic_Enable	=TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor	C0062	Monitors for faults of the High Performance IMU Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND HP IMU Longitudinal Acceleration Correlation Status is Unknown or Not Correlated	HP IMU Longitudinal Acceleration Correlation Status is Unknown or Not Correlated	K_Communications_Fault _Pending HP IMU Longitudinal Acceleration Correlation Status Loss of Communication Fault Active HP IMU Longitudinal Acceleration Correlation Status Failed Safety Fault Active HP IMU Longitudinal Acceleration Correlation Status Availability Indication HP IMU Longitudinal Acceleration Correlation Status Failed Safety Indication HP IMU Common Diagnostic Enable Longitudinal Acceleration Correlation Diagnostic Communication Enable HP IMU Signal Diagnostic Enable Manufactures Enable Counter (MEC) K_Longitudinal _Acceleration_Diagnostic _Enable	= FALSE = FALSE = FALSE = Available = FALSE = TRUE = TRUE = TRUE = 0 =TRUE	Continous	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND any of the following are True: ■HPIMU Primary Longitudinal Acceleration Invalidity is Determined Invalid ■HPIMU Secondary Longitudinal Acceleration Invalidity is Determined Invalid	■HPIMU Primary Longitudinal Acceleration Invalidity is Determined Invalid OR HP IMU Secondary Longitudinal Acceleration Invalidity is Determined Invalid	K_Communications_Fault_Pending HP IMU Primary Longitudinal Acceleration Loss of Communication Fault Active HP IMU Primary Longitudinal Acceleration Availability Indication HP IMU Primary Longitudinal Acceleration Failed Safety Fault Active HP IMU Primary Longitudinal Acceleration Failed Safety Indication HP IMU Secondary Longitudinal Acceleration Loss of Communication Fault Active HP IMU Secondary Longitudinal Acceleration Availability Indication HP IMU Secondary Longitudinal Acceleration Failed Safety Fault Active HP IMU Secondary Longitudinal Acceleration Failed Safety Indication HP IMU Common Diagnostic Enable HP IMU Signal Diagnostic Enable	= FALSE = FALSE = Available = FALSE = FALSE = FALSE =Available = FALSE = FALSE =TRUE =TRUE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Longitudinal Acceleration Invalid Diagnostic Communication Enable Manufactures Enable Counter (MEC) K_Longitudinal _Acceleration_Diagnostic _Enable	=TRUE =0 =TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Yaw Rate Sensor	C0063	Monitors for faults of the High Performance IMU Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND HP IMU Yaw Rate Correlation Status is Unknown or Not Correlated	HP IMU]Yaw Rate Correlation Status is Unknown or Not Correlated	K_Communications_Fault _Pending HP IMU Yaw Rate Correlation Status Loss of Communication Fault Active HP IMU Yaw Rate Correlation Status Failed Safety Fault Active HP IMU Yaw Rate Correlation Status Availability Indication HP IMU Yaw Rate Correlation Status Failed Safety Indication HP IMU Common Diagnostic Enable Yaw Rate Correlation Diagnostic Communication Enable HP IMU Signal Diagnostic Enable Manufactures Enable Counter (MEC) K_Yaw_Rate_Diagnostic_ Enable	= FALSE = FALSE = FALSE = Available = FALSE = TRUE = TRUE = TRUE = 0 =TRUE	Continous	Safety Emissions Neutral Diagnostics - Special Type C
			The diagnostic sub function shall record a	▪HPIMU Primary Yaw Rate Invalidity is	K_Communications_Fault _Pending	= FALSE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			failure if all of the following conditions are met: The Enable Criteria have been satisfied AND any of the following are True: ■HPIMU Primary Yaw Rate Invalidity is Determined Invalid ■HPIMU Secondary Yaw Rate Invalidity is Determined Invalid	Determined Invalid OR HP IMU Secondary Yaw Rate Invalidity is Determined Invalid	HP IMU Primary Yaw Rate Loss of Communication Fault Active	= FALSE		
					HP IMU Primary Yaw Rate Availability Indication	= Available		
					HP IMU Primary Yaw Rate Failed Safety Fault Active	= FALSE		
					HP IMU Primary Yaw Rate Failed Safety Indication	= FALSE		
					HP IMU Secondary Yaw Rate Loss of Communication Fault Active	= FALSE		
					HP IMU Secondary Yaw Rate Availability Indication	=Available		
					HP IMU Secondary Yaw Rate Failed Safety Fault Active	= FALSE		
					HP IMU Secondary Yaw Rate Failed Safety Indication	= FALSE		
					HP IMU Common Diagnostic Enable	=TRUE		
					HP IMU Signal Diagnostic Enable	=TRUE		
					Yaw Rate Invalid Diagnostic			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Communication Enable Manufactures Enable Counter (MEC) K_Yaw_Rate_Diagnostic_ Enable	=TRUE =0 =TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Inertial Sensor	C0520	Monitors for controller faults of the High Performance IMU Upon fault detection the emissions neutral default action action of disabling adaptive cruise and or SuperCruise will occur.	The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied AND HP IMU Initialization Complete is False	HP IMU Initialization Timer > K_HPJMUJnitialization_Delay	Diagnostic System Disabled Vehicle Power Mode Initialization Complete Diagnostic Communication Enable ıK_Common_Diag_Enable K_Communications_Fault_Pending HP IMU Initialization Complete Loss of Communication Fault Active HP IMU Initialization Complete Availability Indication HP IMU Initialization Complete Failed Safety Fault Active HP IMU Initialization Complete Failed Safety Indication HP IMU Reset Occurred Loss of Communication Fault Active HP IMU Reset Occurred Availability Indication is Available HP IMU Reset Occurred Failed Safety Fault Active	= FALSE = Propulsion = TRUE = TRUE = FALSE = FALSE = Active = FALSE = FALSE = FALSE = Active = FALSE	Continous	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HP IMU Reset Occurred Failed Safety Indication	= FALSE		
			The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied and any of the following are TRUE: ■HPIMU Static Offset Calibration Status is Not Calibrated All of the following are TRUE: HP Inertial Sensor Static Offset Box Swap Detected is TRUE HP Inertial Sensor Serial Number Received Value does not equal 0	See malfunction criteria	K_Communications_Fault_Pending HP IMU Static Offset Calibration Status Loss of Communication Fault Active HP IMU Static Offset Calibration Status Availability Indication is HP IMU Static Offset Calibration Status Failed Safety Fault Active HP IMU Static Offset Calibration Status Failed Safety Indication is FALSE HP IMU Common Diagnostic Enable Static Offset Calibration Diagnostic Communication Enable i Manufactures Enable Counter (MEC) is equal to 0 K_Common_Diag_Enable	= FALSE = FALSE = Available = FALSE = FALSE = TRUE = TRUE = 0 = TRUE	Continous	
			The diagnostic sub function shall record a failure if all of the following conditions are met:	See malfunction criteria	K_Communications_Fault_Pending HP IMU Orientation Calibration Status Loss of	= FALSE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			The Enable Criteria have been satisfied and any of the following are TRUE: HP IMU Orientation Calibration Status is not equal to K_Platform_Orientation All of the following are TRUE: HP Inertial Sensor Orientation Box Swap Detected is TRUE HP Inertial Sensor Serial Number Received Value does not equal 0		Communication Fault Active HP IMU Orientation Calibration Status Availability Indication is HP IMU Orientation Calibration Status Failed Safety Fault Active HP IMU Orientation Calibration Status Failed Safety Indication is FALSE HP IMU Common Diagnostic Enable Orientation Calibration Status Diagnostic Communication Enable Manufactures Enable Counter (MEC) is equal to 0 K_Common_Diag_Enable	= FALSE = Available = FALSE = FALSE = TRUE = TRUE = 0 = TRUE		
			The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied and any of the following are True: HP IMU Primary Temperature Invalidity is set to TRUE	See malfunction criteria	K_Communications_Fault_Pending HP IMU Primary Temperature Status Loss of Communication Fault Active HP IMU Primary Temperature Status Availability Indication is HP IMU Primary	= FALSE = FALSE = Available	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			HP IMU Secondary Temperature Invalidity is set to TRUE		Temperature Status Failed Safety Fault Active	= FALSE		
					HP IMU Primary Temperature Status Failed Safety Indication	= FALSE		
					HP IMU Common Diagnostic Enable	= TRUE		
					Primary Temperature Status Diagnostic Communication Enable	= TRUE		
					HP IMU Secondary Temperature Status Loss of Communication Fault Active	= FALSE		
					HP IMU Secondary Temperature Status Availability Indication is	= Available		
					HP IMU Secondary Temperature Status Failed Safety Fault Active	= FALSE		
					HP IMU Secondary Temperature Status Failed Safety Indication is FALSE	=FALSE		
					HP IMU Common Diagnostic Enable	=TRUE		
					Secondary Temperature Status Diagnostic Communication Enable	=TRUE		
					Manufactures Enable Counter (MEC) is equal to 0	= 0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					K_Common_Diag_Enable	= TRUE		
			The diagnostic sub function shall record a failure if all of the following conditions are met: The Enable Criteria have been satisfied HPIMU Low Voltage Detected is TRUE	Voltage <6V	K_Communications_Fault_Pending HP IMU Low Voltage Loss of Communication Fault Active HP IMU Low Voltage Status Availability Indication is HP IMU Low Voltage Status Failed Safety Fault Active HP IMU Low Voltage Status Failed Safety Indication HP IMU Common Diagnostic Enable K_Common_Diag_Enable Low Voltage Diagnostic Communication Enable i	= FALSE = FALSE = Available = FALSE = FALSE = TRUE = TRUE =TRUE	Continous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Voltage Low	P0562	Detects a low 12V system. The DTC is set at 9V, however the emissions neutral default action of disabling adaptive cruise control will not occur until 5V (the voltage at which the CAN bus will fail). This is done to ensure safety critical features can operate at low voltage.	Run Crank voltage low and high	Battery Voltage <= 9.0 Volts	Run/Crank Starter motor status Diagnostic Engine RPM	= Active = Not Engaged = Enabled >= 600.0 RPM	2.5 seconds out of a 3 seconds window Diagnoistic runs every 100 ms	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and of SuperCruise will occur	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Safety Emissions Neutral Diagnostics - Special Type C
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	5 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected .			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
				In all cases, the failure count is cleared when controller shuts down				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Not Programmed	P0602	Indicates the EOCM needs to be programmed. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	This DTC is set via calibration, when KelDND_b_NoStartCal	 =TRUE	Diagnoistic System is not in State of Reset. This includes: -Code Clear in Process -End of Trip Processing -Diagnoistic Re-enable in Process	Diagnoistic System is not in State of Reset.	1 second	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM Long Term Memory Reset	P0603	This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Safety Emissions Neutral Diagnostics - Special Type C
			Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Safety Emissions Neutral Diagnostics - Special Type C
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Time new seed not received exceeded			always running	0.400 seconds	Safety Emissions Neutral Diagnostics - Special Type C
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	5.00		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606.PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							the ECM main processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		Test is Enabled: 1 (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: **P0606_Last Seed Timeout f (Loop Time)**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Performance	P0607	Indicates that the ECM has detected an internal processor integrity performance. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Performs the failure diagnostic for the offline and online BIST results.			Test is enabled: 1 . (If 0, this test is disabled)	3 counts background task/ count in the ECM main processor	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type D, SDA Safety Emissions Neutral Diagnostics - Special Type C
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Processor Serial Peripheral Interface Bus	P30D6	This diagnostic monitors for board level SPI errors between processors Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Failure is determined through the HWIOAPPL SPI Bus network status	8 errors out of a 16 sample window	K_Internal_Control_Module_Processor_SPIBUS3_Enable Vehicle Power Mode When the diagnostic system is not in a short term/state of reset Run crank ignition OR battery is in range AND The specified length of time has passed with the diagnostic enable criteria met	= TRUE = RUN or PROPULSION 9 < V < 16 After 0.00050 seconds	0.05 seconds out of a 0.1 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Processor Serial Peripheral Interface Bus 3	P30D8	This diagnostic monitors for board level SPI errors between processors Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Failure is determined through the HWIOAPPL SPI Bus network status	8 errors out of a 16 sample window	K_Internal_Control_Module_Processor_SPIBUS3_Enable Vehicle Power Mode When the diagnostic system is not in a short term/state of reset Run crank ignition OR battery is in range AND The specified length of time has passed with the diagnostic enable criteria met	= TRUE = RUN or PROPULSION 9 < V < 16 After 0.00050 seconds	0.05 seconds out of a 0.1 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Processor Serial Peripheral Interface Bus 4	P30D9	This diagnostic monitors for board level SPI errors between processors. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Failure is determined through the HWIOAPPL SPI Bus network status	8 errors out of a 16 sample window	K_Internal_Control_Module_Processor_SPIBUS3_Enable Vehicle Power Mode When the diagnostic system is not in a short term/state of reset Run crank ignition OR battery is in range AND The specified length of time has passed with the diagnostic enable criteria met	= TRUE = RUN or PROPULSION 9 < V < 16 After 0.00050 seconds	0.05 seconds out of a 0.1 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
P3186 (Internal Control Module Security Peripheral Performance)	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	2.00	Calibration enable	= True Boolean		Type D, SDA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on CAN Bus 2 Off	U0073	A bus off condition has been detected for the CAN 2 Bus. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	This DTC monitors for a BUS off condition onCAN Bus	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on CAN Bus 1 Off	U0075	A bus off condition has been detected for the CAN 1 Bus. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	This DTC monitors for a BUS off condition on CAN Bus	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication on CAN Bus 8 Off	U007E	A bus off condition has been detected for the CAN 8 Bus. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	This DTC monitors for a BUS off condition on GM HS CAN Bus	A failure is detected for 3 counts for 1000 ms	Vehicle Power Mode EOCM Operational Condition Diagnoistic Enabled Supply Voltage	= RUN = EOCM Comm Active State = True 9 > V > 16V	3 seconds out of a 5 seconds window Diagnoistic runs every 1000 ms	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transmission Control Module	U0101	This DTC monitors for a loss of communication with the tranmission. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: TrnsEstGrAuth TrnsShftLvrPstnAuth TEGP_TransCmndGrAuth	 >0.050 seconds > 0.050 seconds > 0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U010100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Interial Sesnsor	U0125	This DTC monitors for a loss of communication with the tranmission. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: HPIDGJnitCmpIt HPIDG_LoVltgDtd HPIDG_OrntnCalSts HPIDG-PriTemp HPIDG_RstOcc HPIDG_SecTemp HPIDG_StcOfstCalSts HPIDG_LatAccelCorrSts HPIDP_LatAccel HPIDS_LatAccel HPIDG_LngAccelCorrSts HPIDP_LngAccel HPIDS_LngAccel HPIDP_YawAccel HPIDS_YawAccel HPIDG_YawRateCorrSts HPIDP_YawRate HPIDS_YawRate	>0.050 seconds > 0.050 seconds > 0.050 seconds > 0.050 seconds > 0.050 seconds > 0.050 seconds > 0.050 seconds > 0.050 seconds > 0.050 seconds > 0.050 seconds >0.050 seconds > 0.050 seconds > 0.050 seconds > 0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U012500_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Power Steering Control Module	U0131	This DTC monitors for a loss of communication with the power steering system. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: DASTP_StrTrqAuth SteeringTorqueOverlayDeliveredAuth SteeringRequestDeliveredStatusAuth EPSTTDP_TotTorqDlvdAuth ArbitratedSteeringFeatureRequestActiveAuth SteeringWheelHandsOffDetectionConfidenceLevelAuth SteeringWheelHandsOffDetectionModeAuth SWHOP_StAuth SWIP_StrgWhlAngAuth SWIP_StrgWhlAngCalStsAuth SWIP_StrgWhlAngGradAuth	 > 0.05 seconds > 0.25 seconds > 0.25 seconds > 0.05 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.05 seconds > 0.05 seconds > 0.05 seconds	Vehicle Supply Voltage ECU Operating Conditions: U013100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: DayNightStatusAuth BrkPedInitTrvlAchvdAuth BrkPdlPosAuth CP_CruzSecSwStatAuth HSP_DrvAlrtTypCstCurrSetValAuth HapticSeatActiveAuth HSP_HptcStOprtlStsAuth HSP_HptcStPrsntAuth TeenDrvActAuth TransportStorageLogisticsModeActivation VMMP_StatAuth	 > 0.25 seconds > 0.05 seconds > 0.05 seconds > 0.05 seconds >2.50 seconds >2.50 seconds >2.50 seconds >2.50 seconds >2.50 seconds >2.50 seconds >2.50 seconds	Vehicle Supply Voltage ECU Operating Conditions: U014000_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communciation with Restraints Control Module	U0151	This DTC monitors for a loss of communication with the restrains control module. Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: LLDP_LatAccelAuth LLDP_LatAccelSnsrCorrStsAuth LLDP_LongAccelAuth LLDP_LongAccelSnsrCorrStsAuth DriverSeatBeltStatusAuth PCIP_CruiseControlDisableRequestedAuth YRP_YawRateAuth YRP_YawRateCorrAuth	>0.250 seconds >0.250 seconds >0.250 seconds >0.250 seconds > 2.50 seconds > 2.50 seconds > 0.050 seconds > 0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U015100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Long Range	U0235	This DTC monitors for a loss of communication with the long range radar. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: LRRODP_Brst1_Prtctd LRRODP_Brst2_Prtctd LRRODP_Brst3_Prtctd LRRODP_Brst4_Prtctd LRRODP_Brst5_Prtctd LRRODP_Brst6_Prtctd	 > 0.25 seconds > 0.25 seconds >0.25 seconds >0.25 seconds > 0.25 seconds > 0.25 seconds	Vehicle Supply Voltage ECU Operating Conditions: U021100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communciation with Video Processing Module	U023C	This DTC monitors for a loss of communication with the video processing module Upon fault detection the emissions neutral default action action of disabling adaptive cruise control will occur.	Message not Recieved from Controller for: SrrndVsnRLSDatBrst Aux1CameraConnectionStatus Aux2CameraConnectionStatus	 >0.250 seconds >0.250 seconds >0.250 seconds	Vehicle Supply Voltage ECU Operating Conditions: U023C00_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Short Range Left Front	U023D	This DTC monitors for a loss of communication with the short range radar. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: SRRLFODP_Brst1_Prtctd SRRLFODP_Brst2_Prtctd SRRLFODP_Brst3_Prtctd SRRLFODP_Brst4_Prtctd SRRLFODP_Brst5_Prtctd SRRLFODP_Brst6_Prtctd	> 0.20 seconds > 0.20 seconds >0.20 seconds >0.20 seconds > 0.20 seconds > 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U023D00_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Short Range Right Front	U023E	This DTC monitors for a loss of communication with the short range radar. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: SRRRFODP_Brst1_Prtctd SRRRFODP_Brst2_Prtctd SRRRFODP_Brst3_Prtctd SRRRFODP_Brst4_Prtctd SRRRFODP_Brst5_Prtctd SRRRFODP_Brst6_Prtctd	 > 0.20 seconds > 0.20 seconds >0.20 seconds >0.20 seconds > 0.20 seconds > 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U023E00_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Camera Module - Front	U0265	This DTC monitors for a loss of communication with the front camera module. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: FCODP_Brst1_Prtctd FCODP_Brst2_Prtctd FCODP_Brst3_Prtctd FCODP_Brst4_Prtctd FCODP_Brst5_Prtctd FCODP_Brst6_Prtctd FCODP_Brst7_Prtctd FCODP_Brst8_Prtctd FCODP_Brst9_Prtctd FCODP_Brst10_Prtctd	 > 0.25 seconds > 0.25 seconds >0.25 seconds >0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds > 0.25 seconds	Vehicle Supply Voltage ECU Operating Conditions: U026500_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Engine Control Module	U0401	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message:		Vehicle Supply Voltage	9<V< 16	1.5 seconds out of a 2.5 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C
					PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)	= True		
			ActAxleTrqAuth	6 out of 10 messages				
			AdaptiveCruiseControlAxleTorqueCommandLimitingStateAuth	3 out of 4 messages	Time since power up reset or running reset or under voltage or over voltage condition event	> 5 seconds		
			AdaptiveCruiseControlAxleTorqueCommandRequestStateAuth	3 out of 4 messages				
			CCEP_Auth	3 out of 4 messages	OBD Manufacturer Enable Counter	= 0		
			DrvIntndAxlTrqMxAuth	6 out of 10 messages				
			DrvIntndAxlTrqAuth	6 out of 10 messages	At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.			
			EngSpdAuth	6 out of 10 messages				
			PTSndBrkPdlPsAuth	6 out of 10 messages				
			PSP_EngRnngAuth	6 out of 10 messages				
			PSP_PrplSysActvAuth	6 out of 10 messages				
			AtTrnsCmndGrAuth	6 out of 10 messages				
			TrnsEstGrAuth	6 out of 10 messages				
			TrnsShftLvrPstnAuth	6 out of 10 messages				
			AccActPstAuth	6 out of 10 messages				
			AAP_AccelPed0 vrrdActv Auth	6 out of 10 messages				
			VMI1 P_VehTopSpdLimArbdValAuth	6 out of 10 messages				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			VMI1P_VehTopSpdLimModeActvAuth VSADP_VehSpdAvgDrvnAuth VSNDP_VehSpdAvgNDrvnAuth	6 out of 10 messages 3 out of 4 messages 6 out of 10 messages				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transmission Control Module	U0402	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: AtTrnsCmndGrAuth TrnsEstGrAuth TrnsShftLvrPstnAuth	 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.075 seconds out of a 0.125 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Electronic Brake Control Module	U0418	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: ABSAtvAuth ABSFIdAuth BrkPdIDrvAppPrsDetcdAuth BrkPdIDrvAppIPresAuth TCSP_ESCActvAuth TCSP_ESCSysStsAuth TCSP_ActvAuth TCSP_DrvrIntntAuth TCSP_FaildAuth WhlAngVelLFrtAuth WhlAngVelRFrtAuth FWDECP_LFAuth FWDECP_RFAuth FWDECP_RstOccAuth WhlAngVelLRrAuth WhlAngVelRRrAuth RWDECP_LRAuth RWDECP_RRAuth	 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.3 seconds out of a 0.4 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			RWDECP_RstOccAuth	6 out of 10 messages				
			EPBSP_ElecPrkBrkApplStsAuth	3 out of 4 messages				
			WRDSP_LFAuth	3 out of 4 messages				
			WRDSP_LRAuth	3 out of 4 messages				
			WRDSP_RFAuth	3 out of 4 messages				
			WRDSP_RRAuth	3 out of 4 messages				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Power Steering Control Module	U0420	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: DASTP_StrTrqAuth SteeringTorqueOverlayDeliveredAuth SteeringRequestDeliveredStatusAuth EPSTTDP_TotTorqDlvdAuth SteeringAssistStatusAuth SteeringAssistThermalInhibitedAuth SteeringPerformanceActualModeAuth SteeringTorqueRequestOverlayAvailableLeftAuth SteeringTorqueRequestOverlayAvailableRightAuth SteeringWheelAngleIntegrityStatusAuth SteeringWheelTorqueIntegrityStatusAuth ArbitratedSteeringFeatureRequestActiveAuth SteeringWheelHandsOffDetectionConfidenceLevelAuth	 6 out of 10 messages 3 out of 4 messages 3 out of 4 messages 6 out of 10 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9<V< 16 = True > 5 seconds = 0	0.3 seconds out of a 0.4 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			SteeringWheelHandsOffDetectionModeAuth	3 out of 4 messages				
			SWHOP_StAuth	3 out of 4 messages				
			SWIP_StrgWhlAngAuth	6 out of 10 messages				
			SWIP_StrgWhlAngCalStsAuth	6 out of 10 messages				
			SWIP_StrgWhlAngGradAuth	6 out of 10 messages				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Body Control Module	U0422	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: BrkPedlnitTrvlAchvdAuth BrkPdIModTrvlAchAuth BrkPdIPosAuth CP_CruzSecSwStatAuth CP_CruzSpdLmtrSwStatAuth SPMP_SysPwrModeAuth	6 out of 10 message 6 out of 10 message 6 out of 10 message 6 out of 10 message 6 out of 10 message 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	1.5 seconds out of a 2.5 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Instrument Panel Cluster	U0423	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: ACCSAAMSLP_TypAuth ACCSAAMSLP_SpdLimCnfrmdAuth ChimeSystemStateofHealthAuth IPCDisplayStatusAuth LaneFollowingChimeInterfaceFaultDetectedAuth MCRLDOperationalStatusAuth	 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Long Range	U0433	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: LRRODP_Brst1_Prtctd LRRODP_Brst2_Prtctd LRRODP_Brst3_Prtctd LRRODP_Brst4_Prtctd LRRODP_Brst5_Prtctd LRRODP_Brst6_Prtctd	3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.03 seconds out of a 0.04 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Restraints Control Module	U0452	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: LLDP_LatAccelAuth LLDP_LatAccelSnsrCorrStsAuth LLDP_LongAccelAuth LLDP_LongAccelSnsrCorrStsAuth PCIP_CruiseControlDisableRequestedAuth YRP_YawRateAuth YRP_YawRateCorrAuth	 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 8 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Telematics Module	U0499	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur	An error has been detected on one of the following message: RPPSD_Brst RedundantPrecisePositioningSystemHeading RedundantPrecisePositioningSystemLatitude RedundantPrecisePositioningSystemLongitude	 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Type D, SDA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From External Object Calculation Module 1 - Processor 2	U053C	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur	An error has been detected on one of the following message: H2H1DDG1_CRC8_FsFA H2H1DDG2_CRC8_FsFA H2H1DDG3_CRC8_FsFA H2H1DDG4_CRC8_FsFA H2H1DDG5_CRC16_FsFA H2H1DDG6_CRC8_FsFARPPSD_Brst	6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Type D, SDA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Video Processing Module	U053D	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and/or SuperCruise wil occur	An error has been detected on one of the following message: SrrndVsnRLSDatBrst Aux1CameraConnectionStatus Aux2CameraConnectionStatus	 6 out of 10 messages 6 out of 10 messages 6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	8 seconds out of a 10 seconds window (Based on the slowest signal tranmission)	Type D, SDA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Camera Module - Front	U0566	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	An error has been detected on one of the following message: SLVFSP_SpdLimVsnFsdSpdAuth SLVFSP_NwDtdAuth SLVFSP_UntAuth FCODP_Brst1_Prtctd FC0 DP_Brst2_Prtctd FCODP_Brst3_Prtctd FC0 DP_Brst4_Prtctd FC0 DP_Brst5_Prtctd FC0 DP_Brst6_Prtctd FC0 DP_Brst7_Prtctd FC0 DP_Brst8_Prtctd FC0 DP_Brst9_Prtctd FCODP_Brst10_Prtctd FCODP_Brst11_Prtctd	3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages 3 out of 4 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	3 seconds out of a 4 seconds window (Based on the slowest signal tranmission)	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Short Range Left Rear	U1126	This DTC monitors for a loss of communication with the short range radar	Message not Recieved from Controller for: SRRLRODP_Brst1_Prtctd SRRLRODP_Brst2_Prtctd SRRLRODP_Brst3_Prtctd SRRLRODP_Brst4_Prtctd SRRLRODP_Brst5_Prtctd SRRLRODP_Brst6_Prtctd	 > 0.20 seconds > 0.20 seconds >0.20 seconds >0.20 seconds > 0.20 seconds > 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U112600_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Sensor Module - Short Range Right Rear	U1127	This DTC monitors for a loss of communication with the short range radar	Message not Recieved from Controller for: SRRRRODP_Brst1_Prtctd SRRRRODP_Brst2_Prtctd SRRRRODP_Brst3_Prtctd SRRRRODP_Brst4_Prtctd SRRRRODP_Brst5_Prtctd SRRRRODP_Brst6_Prtctd	 > 0.20 seconds > 0.20 seconds >0.20 seconds >0.20 seconds > 0.20 seconds > 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U112700_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Short Range Sensor - Side Left Rear	U1150	This DTC monitors for a loss of communication with the short range radar	Message not Recieved from Controller for: SRRSLRODPB1P_AcqTmStmAuth	> 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U112700_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Radar Short Range Sensor - Side RightRear	U1151	This DTC monitors for a loss of communication with the short range radar	Message not Recieved from Controller for: SRRSRRODPB1P_AcqTmStmAuth	> 0.20 seconds	Vehicle Supply Voltage ECU Operating Conditions: U112700_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Short Range Left Front	U130F	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRLFODP_Brst1_Prtctd SRRLFODP_Brst2_Prtctd SRRLFODP_Brst3_Prtctd SRRLFODP_Brst4_Prtctd SRRLF0 DP_B rst5_Prtctd SRRLF0 DP_B rst6_Prtctd	 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9<V< 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Short Range Right Front	U1310	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRRFODP_Brst1_Prtctd SRR RF0 DP_B rst2_Prtctd SRR RF0 DP_B rst3_Prtctd SRR RF0 DP_B rst4_P rtctd SRRRFODP_Brst5_Prtctd SRR RF0 DP_B rst6_P rtctd	 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9<V< 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Short Range Left Rear	U1311	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRLRCODP_Brst1_Prtctd SRRLRCODP_Brst2_Prtctd SRRLRCODP_Brst3_Prtctd SRRLRCODP_Brst4_Prtctd SRRLRCODP_Brst5_Prtctd SRRLRCODP_Brst6_Prtctd	8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	$9 < V < 16$ = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radar Sensor Module - Short Range Right Rear	U1312	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRRRODP_Brst1_Prtctd SRRRRODP_Brst2_Prtctd SRRRRODP_B rst3_Prtctd SRRRRODP_Brst4_Prtctd SRRRRODP_Brst5_Prtctd SRRRRODP_Brst6_Prtctd	8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages 8 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9<V< 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Radar Short Range Sensor - Side Left Rear	U1366	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRSLRODPB1P_AcqTmStmAuth	6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Radar Short Range Sensor - Side Right Rear	U1367	This diagnostic monitors for signal protections (ARC, Checksum, or MAC) violations	An error has been detected on one of the following message: SRRSRRODPB1P_AcqTmStmAuth	6 out of 10 messages	Vehicle Supply Voltage PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active) Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter At least 5 seconds after a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition.	9 < V < 16 = True > 5 seconds = 0	0.4 seconds out of a 0.5 seconds window	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A on CAN 1	U1607	This DTC monitors for a loss of communication with the gateway module on CAN1 Upon fault detection the emissions neutral default action action of disabling adaptive cruise control and/or SuperCruise	Message not Recieved from Controller for: ChimeManagerStatus	 > 2.50 seconds	Vehicle Supply Voltage ECU Operating Conditions: U160700_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communciation with Brake System Control Module on CAN 1	U160F	This DTC monitors for a loss of communication with the brake controller on CAN1 Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: ABSAtvAuth ABSFldAuth BrkPdlDrvAppPrsDetcdAuth BrkPdlDrvApplPresAuth TCSP_ESCActvAuth TCSP_ESCSysStsAuth TCSP_FaildAuth WhlAngVelLFrtAuth WhlAngVelRFrtAuth FWDECP_LFAuth FWDECP_RFAuth FWDECP_RstOccAuth WhlAngVelLRrAuth WhlAngVelRRrAuth RWDECP_LRAuth RWDECP_RRAuth RWDECP_RstOccAuth	 > 0.05 seconds > 0.05 seconds > 0.05 seconds > 0.05 seconds > 0.625 seconds > 0.625 seconds > 0.625 seconds > 0.05 seconds > 0.05 seconds > 0.250 seconds > 0.250 seconds > 0.250 seconds >0.05 seconds >0.05 seconds > 0.250 seconds > 0.250 seconds > 0.250 seconds	Vehicle Supply Voltage ECU Operating Conditions: U160F00_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communciation with Brake System Control Module on CAN 2	U1610	This DTC monitors for a loss of communication with the brake controller on CAN2. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: VAP_ActlVehAccelAuth CBIP_ACCBrkgActvAuth ACCPrfMdRq ABSPr EPBSP_ElecPrkBrkApplStsAuth TBI2P_TrlrBrkgManAppAtvAuth WRDSP_LFAuth	> 0.30 seconds > 0.05 seconds > 2.50 seconds > 2.50 seconds > 0.25 seconds > 0.30seonds > 0.30 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161000_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Engine Control Module on CAN2	U1611	This DTC monitors for a loss of communication with the engine control module on CAN 2. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	Message not Recieved from Controller for: CollisionPreparationSystemAxleTorqueCommandRequestStateAuth DrvIntndAxlTrqMnAuth DrvIntndAxlTrqMxAuth DrvIntndAxlTrqAuth EngSpdAuth TrnsEstGrAuth TrnsShftLvrPstnAuth AccActPstAuth VSADP_VehSpdAvgDrvnAuth VSNDP_VehSpdAvgNDrvnAuth WhlDstPrRvlFrtAuth WhlDstPrRvlRrAuth	>0.250 seconds >0.100 seconds >0.100 seconds > 0.100 seconds >0.050 seconds >0.050 seconds > 0.050 seconds >0.050 seconds >0.250 seconds >0.625 seconds >2.50 seconds >2.50 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Lost Communication with External Object Calculation Module 1 - Processor 2 on Ethernet	U1623	This DTC monitors for a loss of communication with the EOCM HCP1 on internal ethernet. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur	Message not Recieved from Controller for: H2H1DDG1_CRC8_LcFA H2H1DDG2_CRC8_LcFA H2H1DDG3_CRC8_LcFA H2H1DDG4_CRC8_LcFA H2H1DDG5_CRC16_LcFA H2H1DDG6_CRC8_LcFA	>0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Telematics Control Platform on Ethernet	U1624	This DTC monitors for a loss of communication with the TCP on internal ethernet. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur	Message not Recieved from Controller for: PPPS2DAbsolutePositionErrorEstimate PPPSAbsoluteHeadingErrorEstimate PrimaryPrecisePositioningSystemCalendarDay PrimaryPrecisePositioningSystemCalendarYear PrimaryPrecisePositioningSystemElevation PrimaryPrecisePositioningSystemHeading PrimaryPrecisePositioningSystemLatitude PrimaryPrecisePositioningSystemLocationUsable PrimaryPrecisePositioningSystemLongitude PrimaryPrecisePositioningSystemLowerGlobalTimeStamp PrimaryPrecisePositioningSystemMode PrimaryPrecisePositioningSystemSignalAcquisitionTime	>0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9<V< 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			PrimaryPrecisePositioning SystemTimeofDay PrimaryPrecisePositioning SystemllpperGlobalTime Stamp	>0.050 seconds >0.050 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with External Object Calculation Module 1 - Processor 1 on Ethernet	U1625	This DTC monitors for a loss of communication with the EOCM HCP1 on internal ethernet. Upon fault detection the emissions neutral default action action of disabling adaptive cruise and SuperCruise will occur	Message not Recieved from Controller for: H1H2DDG1_CRC8 H1H2DDG2_CRC8 H1H2DDG3_CRC8 H1H2DDG4_CRC8 H1H2DDG5_CRC16 H1H2DDG6_CRC8	>0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds >0.050 seconds	Vehicle Supply Voltage ECU Operating Conditions: U161100_Enable Exceptions: If the vehicle is in Transport Mode OR Within the first 5 seconds of a power-up reset, a running reset, a recovery from an under voltage condition or a recovery from an over voltage condition. OR When a bus off condition (U007X) is Active	9 < V < 16 Any Partial Network that the ECU participates in is active = True	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.

Key Table Not Provisioned / Authoritative Counter At Maximum	U1960	This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value.
		
		Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.
			During controller initialization:
			
			IF (Any Security Peripheral Key Slot reports as Empty)
			-OR-
			(Any Authoritative Counter is at MAX value)
			
			During controller operation:
			
			IF (A Security Peripheral Key Slot reports as Empty)
			-OR-
			(An Authoritative Counter is at MAX value)
						Diagnostic Enabled:
						
						KaSSAR_h_DiagEnableCals[1] == Enabled
								Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1961 (Security Peripheral Performance)	U1961	This DTC indicates that the ECU security peripheral has reported that it has failed. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur.	The ECU security peripheral reports that the security peripheral hardware has failed.			Diagnostic Enabled: KaSSAR_h_DiagEnableCals[2] == Enabled		Safety Emissions Neutral Diagnostics - Special Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1962 (Unable to Authenticate Serial Data Message)	U1962	This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle. Upon fault detection the emissions neutral default action action of disabling adaptive cruise will occur. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	Message authentication on a single key slot has failed a configurable number of times.	=>3		Diagnostic Enabled: 1.00 (True)		Type D, SDA

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 0. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINERUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 1. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINERUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 2. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINERUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors system angle sensor 3. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINERUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors motor sensor 0. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINERUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C
Hand Wheel Angle Sensor	C0051	Monitors motor sensor 1. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Failure to communicate with sensor, Protection value faults, sensor power supply faults.	Fault Detected	$1F1 (SYSTEMPOWERMODE) $0C9 (ENGINERUN ACTIVE) DIAGNOSTICENABLED Voltage	= RUN/ACC = TRUE TRUE 6V < voltage < 16V	4ms (2 failures/ 2ms/sample)	Safety Emissions Neutral Diagnostic - Type C

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bus Signal Failure	U007E	Control Module Communication CAN Bus 8 Off Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	CAN driver indicates a bus off condition has occurred	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U007E00_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event Power Mode	9V < voltage < 16V = True = Enabled = Inactive > 5 seconds = Run	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Lost Communication with Central Gateway Module	U0146	Detects loss of communication between FCM_LC (Front Camera Module Low Content) and CGM (Central Gateway Module). The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the camera will function normally. The emissions neutral default action is either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the	Monitored Messages: CGM_CAN8_MSG05 CGM_CAN8_MSG03 CGM_CAN8_MSG01	= 2.5000 seconds (timeout) = 2.5000 seconds (timeout) = 0.0250 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U014600_ENABLE Time since power up reset or running reset or under voltage or over voltage condition event DTC U007E00	9V < voltage < 16V = True = Enabled > 5 seconds = Inactive	Monitored continuously while CAN frames are being transmitted and received Fault maturation time is 02.5000 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Body Control Module	U0422	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the Body Control Module (BCM). The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the camera will function normally. The emissions neutral default action is either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period SysPwrMode_Prtctd_MSG	= 0.62500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Body Control Module (BCM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Central Gateway Module	U0447	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the Central Gateway Module (CGM). The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the camera will function normally. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period BkupSysPwrMode_Prtctd_MSG	= 0.62500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the External Object Calculation Module 1. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic
Lost Communication with External Object Calculating Module 1 on CAN Bus 8	U1616	Detects loss of communication between FCM_LC (Front Camera Module Low Content) and EOCM (External Object Calculating Module) on CAN bus 8. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	The following messages are monitored for late arrival and this code sets if a message times out HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U161600_ENABLE Time since power up reset or running reset or under voltage or over voltage condition event DTC U007E00	9V < voltage < 16V = True = Enabled > 5 seconds = Inactive	Monitored continuously while CAN frames are being transmitted and received Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to the final Key AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received.	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received.	Safety Non-MIL Emission neutral Diagnostic
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer.	1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196192_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Unable to Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthentificationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Camera Module Low Content Internal/Programming failures	U3000	Control Module General Checksum Failure. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3000.	Internal Front Camera Module Low Content (FCM_LC) Memory Checksum Failure Detected.	= Fault Detected	Vehicle Supply Voltage U300041_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module General Memory Failure	General Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage U300042_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Data Memory Failure	a data (or working) memory failure for embedded systems using FLASH RAM memory has occurred	= Fault Detected	Vehicle Supply Voltage U300044_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Internal Electronic Failure	Front Camera Module Low Content (FCM_LC) internal circuit micro (Not Image Processing Engine) is detected - BIST Fail - Registier Check Error - Internal Voltage Out of Range - Internal Comm Error	= Fault Detected	Vehicle Supply Voltage U300049_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Not Programmed	Application Data File Not Programmed CRC Calculated in Chunks - Missing Data	= Fault Detected	Vehicle Supply Voltage U300051_ENABLE	9V < voltage < 16V = Enabled	Startup	Safety Non-MIL Emission neutral Diagnostic
		Control Module Deactivated due to incorrect or invalid data provied to FCM OR Internal Falure (as listed)	-Bad or out of date vehicle yaw, or speed provided -Imager timestamp indicates missing image -EyeQ performs CRC check on program section of code in DDR RAM -Internal data strcuture CRC mismatch -Internal input signals storage corruption -Stack Over/Underflow detection -EyeQ challenge and response failure -Clock Error -All EyeQ messages stopped - Stale Data	= Fault Detected	Vehicle Supply Voltage U300053_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Missing Calibration	Camera has not been calibrated or camera calibration process failed. Out of calibration	= Fault Detected	Vehicle Supply Voltage U300054_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Not Configured	Sub system option content or vehilcle option content not programmed	= Fault Detected	Vehicle Supply Voltage U300055_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Invalid Incompatible Configuration	Control Module or System Configuration not valid	= Fault Detected	Vehicle Supply Voltage U300056_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Control Module Invalid Incompatible Software Component	Software component not compatible with detected hardware/software	= Fault Detected	Vehicle Supply Voltage U300057_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
Battery Supply Voltage	U3003	Battery Voltage - Circuit Voltage Below Threshold. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3003.	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ethernet Bus 11 (+)	B1A09	Monitoring for a failure of the Ethernet Bus connected to the HDLM Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	Upon receipt of Link status =Down for a specific port for a calibratable amount of time	<1 second	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. # disabled	Continuosuly	Safety Non-MIL Emission neutral Diagnostic
Ethernet Bus 12 (+)	B1A0B	Monitoring for a failure of the Ethernet Bus connected to the HDLM Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	Upon receipt of Link status =Down for a specific port for a calibratable amount of time	<1 second	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. # disabled	Continuosuly	Safety Non-MIL Emission neutral Diagnostic
Map Data Corrupted	B1BA5	Monitors for a failure of the updated map pushed to the HDLM Modue Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	At startup, The updated map in memory fails the integrity check	Fault detected	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. # disabled	The map age verification algorithm will RUN once on Power Up until it completes.	Safety Non-MIL Emission neutral Diagnostic
Map Information Not Updated	B2BA1	The map data is not up to date Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	(current date) - (last successful map update)	>= calibration attribute MaxMapAge (6 months)	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. # disabled	The map age verification algorithm will RUN once on Power Up until it completes.	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Monitors for the intergrity of the data being received from the EOCM module	When the ECU has determined that the signal payload received has a failed safety, security (MAC), protection (PV) or continuous operation (ARC, Checksum) indication as per the signal status monitor	Fault detected	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9 - 16V = Any Virtual Network that the ECU participates in is active. + disabled	Continuosuly	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Telematics Control Platform Module on Ethernet Bus	U1624	Monitoring for a failure of the communication with the TCP Module on Ethernet Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	Upon receipt of Link status =Down for a specific port for a calibratable amount of time	<1 second	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9- 16V = Any Virtual Network that the ECU participates in is active. # disabled	Continuosuly	Safety Non-MIL Emission neutral Diagnostic
Lost Communication with External Object Calculating Module 1 - Processor 1 on Ethernet Bus	U1625	Monitoring for a failure of the communication with the EOCM Module on Ethernet Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the	Upon receipt of Link status =Down for a specific port for a calibratable amount of time	<1 second	Vehicle Power Mode: VN Activation Conditions: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN COMM_ENABLE=HIGH = 9- 16V = Any Virtual Network that the ECU participates in is active. # disabled	Continuosuly	Safety Non-MIL Emission neutral Diagnostic
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to the final Key AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power up. 3) Monitored whileRID	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received.	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196192_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Unable To Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthenticationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Control Module		General Checksum Failure	Internal Front Camera Module Low Content (FCM_LC) Memory Checksum Failure Detected.	= Fault Detected	Vehicle Supply Voltage U300041_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		General Memory Failure	General Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage U300042_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Special Memory Failure	At startup, error in file server mount file Unable to perform file read/write operation on file system. After four retries to read/write all return fail	= Fault Detected	Vehicle Supply Voltage U300043_ENABLE	9V < voltage < 16V = Enabled	At Start-up	Safety Non-MIL Emission neutral Diagnostic
		Data Memory Failure	a data (or working) memory failure for embedded systems using FLASH RAM memory has occurred	= Fault Detected	Vehicle Supply Voltage U300044_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
	U3000	Program Memory Failure	working memory failure for embedded systems using ROM memory has occurred	= Fault Detected	Vehicle Supply Voltage U300045_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Calibration / Parameter Memory Failure	In case a Data Flash memory failure is detected.	= Fault Detected	Vehicle Supply Voltage U300046_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Watchdog and Safety Microcontroller Failure	In case a Data Flash memory failure is detected.	= Fault Detected	Vehicle Supply Voltage U300046_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Supervision Software Failure	Failure of Safety MCU Software	= Fault Detected	Vehicle Supply Voltage U300048_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Internal Electronic Failure	Front Camera Module Low Content (FCM_LC) internal circuit micro (Not Image Processing Engine) is detected -BIST Fail - Registier Check Error - Internal Voltage Out of Range	= Fault Detected	Vehicle Supply Voltage U300049_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Over Temperature	VPM internal temperature above threshold	75C	Diagnostic_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Not Programmed	Default Calibrations Stored. This is checked by verifying a specific signature is written at calibration section	Memory location is Set to OxFF or Calibration signature is not present	Vehicle Power Mode: Supply Voltage Virtual Network condition Diagnostic_ENABLE	= RUN = 9 - 16V = Any Virtual Network that the ECU participates in is active. # disabled	Once at power-up	Safety Non-MIL Emission neutral Diagnostic
		Missing Calibration	Indicates faults related to operational software, calibrations, and options	= Fault Detected	Vehicle Supply Voltage U300054_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Invalid Incompatible Software Componet	Incorrect software program	= Fault Detected	Vehicle Supply Voltage U300057_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Signal Compare Failure	Signal comparison has failed within contrller	= Fault Detected	Vehicle Supply Voltage U300062_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Battery Voltage	U3003	Battery Voltage - Circuit Voltage Below Threshold. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using front camera information will occur. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3003.	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active.	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication CAN Bus 8 Off	U007E	This DTC monitors for a BUS 8 off condition Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	CAN driver indicates a bus off condition has occurred	= Fault detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U007E00_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event Power Mode OBD Manufacturing Enable	9V< voltage < 16V = True = Enabled = Inactive > 5 seconds = Run	Monitored continuously while CAN frames are being transmitted and received Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Body Control Module	U0422	Detects invalid data errors in messages received from the Body Control Module (BCM) e.g. alive rolling count, checksum, MAC The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the LRR will function normally. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period SysPwrMode_Prtctd_MSG	= 0.62500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturing Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Body Control Module (BCM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Central Gateway Module	U0447	Detects invalid data errors in messages received from the Central Gateway Module (CGM) e.g. alive rolling count, checksum, MAC The emissions neutral default action (described below) will only occur if both U0422 and U0477 are triggered at the same time, otherwise the LRR will function normally. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period BkupSysPwrMode_Prtctd_MSG	= 0.625 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturing Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from External Object Calculating Module 1	U053B	Detects invalid data errors in messages received from the External Object Calculating Module (EOCM) e.g. alive rolling count Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic
Lost Communication with External Object Calculating Module 1 on CAN Bus 8	U1616	This DTC monitors for a loss of communication with the External Object Calculation Module on Can Bus 8 Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored for late arrival and this code sets if a message times out HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U161600_ENABLE Time since power up reset or running reset or under voltage or over voltage condition event DTC U007E00 OBD Manufacturer Enable	9V < voltage < 16V = True = Enabled > 5 seconds = Inactive = 0	Monitored continuously while CAN frames are being transmitted and received Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to Key 20 AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power up. 3) Monitored whileRID 0x0200; Provision Security Peripheral General Keys is being executed	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the radar must be replaced due to an internal error Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The two following conditions lead to this failure: 1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). These failures are detected by monitoring the following conditions updated by the security peripheral ERC function: ERC_KEY_INVALID ERC_BUSY ERC_GENERAL_FAILURE ERC_KEY_NOT_AVAILABLE ERC_KEY_UPDATE_ERROR ERC_KEY_WRITE_PROTECTED ERC_MEMORY_FAILURE ERC_NO_DEBUGGING ERC_NO_SECURE_BOOT	= Fault detected For all ERC errors: = True	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformance DiagnosticPowerModeTime U196191_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received DTC matures instantly	Safety Non-MIL Emission neutral Diagnostic
Unable To Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthentificationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage or	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Radar Internal/Programming failures		Control Module General Failure - No Sub Type Information available. Internal voltage problems, problems with the RF, ATIC or MCU power supply. Upon fault detection for any fault under U3000, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	Radar has an internel supply voltage error or minimum excitation level magnet lost. This DTC is set If the following voltages are measured to be out of range. Voltage UBATT (with CAT2 reaction) Voltage UBATT Warn Level (UBATT_CHECK_CAT3) Voltage 5V0_SMPS Voltage 3V6_SMPS Voltage ADC Bandgap 0 Voltage ADC Bandgap 1	< 5.665V or > 27.811V < 8.575V or > 16.503V < 4.749V or > 5.240V < 3.415V or > 3.776V < 1.183V or > 1,255V < 1.183V or	Vehicle Supply Voltage U300000_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module General Checksum Failure	Radar Memory Checksum Failure occurs. A CRC (cyclic redundance check) is performed on NVM (non-volatile memory) and a fault is triggered if the calculation does not validate the information stored in NVM.	= Fault detected	Vehicle Supply Voltage U300041_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module General Memory Failure. Indicates a serious Memory issue; i.e. a failure within the hardware or information is lost that cannot be recovered. If the non-volatile memory (NVM) component reports read errors regarding the integrity of the data or if data is corrupted or if certain read, write, erase procedures fail.	The memory component triggers various error DEMs (diagnostic event monitors) to determine a failure. Failures can be discovered during various memory operations in the flash. Common failures include - memory erase/ read/ write errors. Comparison failures, wrong block IDs and unexpected flash IDs	= Fault detected	Vehicle Supply Voltage U300042_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Control Module Special Memory Failure. Proposed to be a mild memory issue, i.e. A failure occurs in which the radar can recover and if data is lost, the data can be recovered. For example this can trigger if a redundant block is lost.	The NVM component triggers various error DEMs (diagnostic event managers) to determine a failure. Common faults include - loss of redundancy, attempted writes to protected memory.	= Fault detected	Vehicle Supply Voltage U300043_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Internal Electronic Failure. Consists of general internal hardware issues that are not related to memory, temperature or voltage. This diagnostic covers issues with the RF (radio frequency) chirps, resets, DMA (direct memory access) bus failures, stack overflows, hardware timeouts, watchdog issues etc.	Radar internal circuit failure occurs such as: 1) Multiple random access memory errors 2) Watchdog errors These failures are mostly related to issues with the RF (radio frequency) board triggered from the RFCOM (radio frequency communication) component, the driver for the high frequency. Can be caused also by hardware timeouts, failures in the MMIC (millimeter integrated circuit - radio frequency chip), internal MCU (microprocessor control unit) problems like DMA (direct memory access) bus failures or register failures.	= Fault detected	Vehicle Supply Voltage U300049_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Over Temperature	Radar RF internal temperature is above threshold such that it cannot operate effectively.	= Fault detected	Vehicle Supply Voltage U30004B_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
	U3000	Control Module not Programmed	Sensor operating software not sucessfully flashed on to the microcontroller	= Fault detected	Vehicle Supply Voltage U300051_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Missing Calibration. Triggers if the APAR application parameters)/PPAR (production parameters) is missing from the software.	Radar has not been calibrated or Radar calibration process failed indicated by: k_default_calibration	= True	Vehicle Supply Voltage U300054_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Not Configured. Sensor has not yet completed a successful aiming process.	Radar sensor address has not been learned and locked in. Additional the following values have not yet been aimed and provided to the radar: azmiuth (left and right), elevation (high, low)	= Fault detected	Vehicle Supply Voltage U300055_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Control Module Invalid Incompatible Configuration. APAR (application parameters) Calibration values are outside the valid calibration range.	Control Module or System Configuration not valid such that calibration values are outside the valid calibration range. On initialization, every calibration is range checked to be within specified high and low range limits. If one of these values are out of range, then the APAR (application parameters) is rejected and a default APAR is loaded instead.	= Fault detected	Vehicle Supply Voltage U300056_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Invalid Incompatible Software Component. The calibration table doesn't align properly and is no longer compatible with the OP software.	Software component not compatible with detected hardware/software. For the calibration table, it's checked with a "versioning" system. Another calibration was added to the APAR (application parameters) as a version number. This number increments when the table is modified. The SW has a defined version number as well. If these two match, then it's known that the SW is compatible with the APAR and if they don't this fault is triggered.	= Fault detected	Vehicle Supply Voltage U300057_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Wrong mounting position - the radar is not mounted correctly	Absolute value of Angle Misalignment Any of the following bits of Active Fault are set:	> k_Radar_Misalignment_Out_Of_Range alignment_mode horizontal_alignment_out_of_range vertical_alignment_out_of_range alignment_routine_failed_fault	Vehicle Supply Voltage U300076_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Incorrect Assembly - This DTC indicates a repositioned sensor or wiring fault.	Learned address and current address position mismatch	Active_Fault.bit.sensor_addr_unstable_fault = TRUE	Vehicle Supply Voltage U300095_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Component or System Operation Obstructed or Blocked. This is caused by a radar algorithm detecting blockage on the sensor, keeping it from detecting objects.	The operation of a component is prevented by an obstruction which trigers this fault. This is detected if the immediate environment of the radar does not change for a given period of time, the radar determines that it is blocked and a fault is detected.	= Fault detected	Vehicle Supply Voltage U300097_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Component or System Operating Condition. For this DTC, it is monitoring the RF (radio frequency) and Internal MCU (microprocessor control unit) temperatures.	Radar internal temperature at threshold for the RF and internal MCU	= Fault detected	Vehicle Supply Voltage U30009A_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Radar Power Circuit	U3003	Battery Voltage - Circuit Voltage Below Threshold Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. This applie to high and low voltage diagnostics	Radar supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Radar supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Multi Axis Accelerometer Performance	C006A	This sub type is used for failures where the control module has detected that the component performance is outside its expected range or operating in an incorrect way. Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags.	One of the following IMU (Inertial Measuement Unit) failures occurs within the SDM (Sensing and Diagnostic module) 1) Sensor 1 Yaw Data 2) Sensor 2 Yaw Data 3) Sensor 1 Longitudinal Acceleration Data 4) Sensor 2 Longitudinal Acceleration Data 5) Sensor 1 Lateral Acceleration Data 6) Sensor 2 Lateral Acceleration Data For 7,8,9 a correlation algorithm compares data from 2 separate IMUs (Inertial Measurement Unit) and fails if the sensor data sample by sample comparrisons are outside of tolerance 7) Yaw Data Correlation Failure YRP_YawRateCorrAuth 8) Longitudinal Acceleration Correlation Failure LLDP_LongAccelSnsrCorrStsAuth 9) Lateral Acceleration Correlation Failure LLDP_LatAccelSnsrCorrStsAuth	(1) to (6) = Invalid (7) to (9) = $03 (Uncorrelated)	Vehicle Supply Voltage C006A00_ENABLE	9V < voltage < 16V = Enabled	Within 0.05000 seconds	Safety Non-MIL Emission Neutral Diagnostic
Control Module Communication CAN Bus 1 Off	U0075	This DTC monitors for a BUS 1 off condition. Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags.	CAN driver indicates a bus off condition has occurred	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U007500_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event Power Mode	9V < voltage < 16V = True = Enabled = Inactive > 5 seconds = Run	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission Neutral Diagnostic
Sensing and Diagnostic Module Internal/Programming failures	U3000	SMI7xx - SPI interprocessor communications - open circuit. Detected by the SPI software. Diagnostic runs at start-up and every 0.001 s Upon fault detection, the SDM will flag IMU data is Invalid or Uncorrelated. Upstream consumers such as adaptive cruise control will disable based on these flags. Applies to all DTC within U3000	SPI diagnostic software detects an open circuit	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive/Predrive =6.0 < V < 18.0	0.003 seconds	Safety Non-MIL Emission Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		SMI7xx - Chip external supply - open circuit. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s	Voltage supply detects an open circuit	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 seconds	
		SMI7xx - SPI interprocessor communications - short circuit. Detected by the SPI software. Diagnostic runs at start-up and every 0.001 s	SPI diagnostic software detects an short circuit	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive/Predrive =6.0 < V < 18.0	0.003 seconds	
		SMI7xx - Chip external supply - short circuit. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s	Voltage supply detects an short circuit	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 seconds	
		SMI7xx - Chip external supply - Out-of-Range. Detected by the voltage supply diagnostic. Diagnostic runs every 0.001 s	Voltage supply detects voltage out of range	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 seconds	
		SMI7xx - Drift or oscillations or Offset in the valid range	1) Error in Calculating IMU Offset OR 2) When in drive mode if the saturation thresholds out of range for a period of time (3 seconds) OR 3) When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data	For 1) and 3) detected by SMI7xx Software. For 2) X Accel >1g Y Accel > 1g Yaw >40 deg/s	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	1) 1.042 s 2) 3 s 3) 0.04 s	
		SMI7xx - Values stuck in valid range	IMU and Roll - In PDC, sensor self-tests are performed and will set an error condition if a failure is detected	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive =6.0 < V < 18.0	3 occurances - diagnostic operates at start-up	
			IMU - When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data.	= Fault Detected	DTC Calibration SDM Power Mode ECU Status	= Enabled = Run/Propulsion = Drive	0.04 s	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		System Communication SPI - Aged data (delay, repeated data, re-sequencing)	IMU and Roll - In PDC, sensor self-tests are performed and will set an error condition if a failure is detected	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive =6.0 < V < 18.0	3 occurances - diagnostic operates at start-up	
			IMU - When in drive mode, a failure will be detected by the Level 1 diagnostic comparison of the primary and secondary sensor data.	= Fault Detected	DTC Calibration SDM Power Mode ECU Status	= Enabled = Run/Propulsion = Drive	0.04 s	
		System Communication SPI - Corrupted Data (incorrect data, insertion of data, re-sequencing)	Corrupted SPI data errors are detected by SPI diagnostics, including CRC and address diagnostics, internal to the sensor as well as in application software. If a SPI error is detected, an error condition is set.	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive/Drive =6.0 < V < 18.0	0.03 s	
		System Communications SPI - Loss of Data	Sensor data is monitored for availability. If it is unavailable, an error condition will be set.	No data detected for fault threshold	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive/Drive =6.0 < V < 18.0	0.03 s	
		System Communications SPI - 'Interrupted data (partial data transmit or no data transmit)	Interrupted SPI data errors are detected by SPI diagnostics, including CRC and address diagnostics, internal to the sensor as well as in application software. If a SPI error is detected, an error condition is set.	= Fault Detected	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Predrive/Drive =6.0 < V < 18.0	0.03 s	
		SMI7xxx Power Supply	Under Voltage - The sensor monitors Vcc for under voltage and will set an error condition if a failure is detected.	< 3.13 V	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 s	
			Over Voltage - The sensor monitors Vcc for over voltage and will set an error condition if a failure is detected.	>3.47 V	DTC Calibration SDM Power Mode ECU Status Supply Voltage	= Enabled = Run/Propulsion = Drive =6.0 < V < 18.0	0.03 s	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Supply Voltage	U3003	Battery Voltage - Circuit Voltage Below Threshold The DTC code will set at 9 V, however the emissions neutral default action of stopping tramissions of data, and disabling adaptive cruise control will not occur until ~5V, or whenever the SDM can no longer send CAN messages	Sensing and Diagnostic Module (SDM) supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission Neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Sensing and Diagnostic Module (SDM) supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication CAN Bus 8 Off	U007E	This DTC monitors for a BUS 8 off condition Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	CAN driver indicates a bus off condition has occurred	= Fault detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U007E00_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event Power Mode OBD Manufacturing Enable	9V< voltage < 16V = True = Enabled = Inactive > 5 seconds = Run	Monitored continuously while CAN frames are being transmitted and received Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Body Control Module	U0422	Detects invalid data errors in messages received from the Body Control Module (BCM) e.g. alive rolling count, checksum, MAC Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period SysPwrMode_Prtctd_MSG	= 0.62500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturing Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Body Control Module (BCM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from Central Gateway Module	U0447	Detects invalid data errors in messages received from the Central Gateway Module (CGM) e.g. alive rolling count, checksum, MAC Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period BkupSysPwrMode_Prtctd_MSG	= 0.625 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturing Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the Central Gateway Module (CGM) Fault maturation time is 0.62500 seconds	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Detects invalid data errors in messages received from the External Object Calculating Module (EOCM) e.g. alive rolling count Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the	The following messages are monitored. This code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with External Object Calculating Module 1 on CAN Bus 8	U1616	This DTC monitors for a loss of communication with the External Object Calculation Module on Can Bus 8 Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	The following messages are monitored for late arrival and this code sets if a message times out HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable U161600_ENABLE Time since power up reset or running reset or under voltage or over voltage condition event DTC U007E00 OBD Manufacturer Enable	9V < voltage < 16V = True = Enabled > 5 seconds = Inactive = 0	Monitored continuously while CAN frames are being transmitted and received Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic
Radar Internal/Programming failures		Control Module General Failure - No Sub Type Information available. Internal voltage problems, problems with the RF, ATIC or MCU power supply. Upon fault detection for any fault under U3000, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer.	Radar has an internel supply voltage error or minimum excitation level magnet lost. This DTC is set If the following voltages are measured to be out of range. Voltage UBATT (with CAT2 reaction) Voltage UBATT Warn Level (UBATT_CHECK_CAT3) Voltage 5V0_SMPS Voltage 3V6_SMPS Voltage ADC Bandgap 0 Voltage ADC Bandgap 1	< 5.665V or > 27.811V < 8.575V or > 16.503V < 4.749V or > 5.240V < 3.415V or > 3.776V < 1.183V or > 1,255V < 1.183V or	Vehicle Supply Voltage U300000_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module General Checksum Failure	Radar Memory Checksum Failure occurs. A CRC (cyclic redundance check) is performed on NVM (non-volatile memory) and a fault is triggered if the calculation does not validate the information stored in NVM.	= Fault detected	Vehicle Supply Voltage U300041_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Control Module General Memory Failure. Indicates a serious Memory issue; i.e. a failure within the hardware or information is lost that cannot be recovered. If the non-volatile memory (NVM) component reports read errors regarding the integrity of the data or if data is corrupted or if certain read, write, erase procedures fail.	The memory component triggers various error DEMs (diagnostic event monitors) to determine a failure. Failures can be discovered during various memory operations in the flash. Common failures include - memory erase/ read/ write errors. Comparison failures, wrong block IDs and unexpected flash IDs	= Fault detected	Vehicle Supply Voltage U300042_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Special Memory Failure. Proposed to be a mild memory issue, i.e. A failure occurs in which the radar can recover and if data is lost, the data can be recovered. For example this can trigger if a redundant block is lost.	The NVM component triggers various error DEMs (diagnostic event managers) to determine a failure. Common faults include - loss of redundancy, attempted writes to protected memory.	= Fault detected	Vehicle Supply Voltage U300043_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Internal Electronic Failure. Consists of general internal hardware issues that are not related to memory, temperature or voltage. This diagnostic covers issues with the RF (radio frequency) chirps, resets, DMA (direct memory access) bus failures, stack overflows, hardware timeouts, watchdog issues etc.	Radar internal circuit failure occurs such as: 1) Multiple random access memory errors 2) Watchdog errors These failures are mostly related to issues with the RF (radio frequency) board triggered from the RFCOM (radio frequency communication) component, the driver for the high frequency. Can be caused also by hardware timeouts, failures in the MMIC (millimeter integrated circuit - radio frequency chip), internal MCU (microprocessor control unit) problems like DMA (direct memory access) bus failures or register failures.	= Fault detected	Vehicle Supply Voltage U300049_ENABLE Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in is active	9V < voltage < 16V = Enabled > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Control Module Over Temperature	Radar RF internal temperature is above threshold such that it cannot operate effectively.	= Fault detected	Vehicle Supply Voltage U30004B_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module not Programmed	Sensor operating software not sucessfully flashed on to the microcontroller	= Fault detected	Vehicle Supply Voltage U300051_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
	U3000	Control Module Missing Calibration. Triggers if the APAR application parameters)/PPAR (production parameters) is missing from the software.	Radar has not been calibrated or Radar calibration process failed indicated by: k_default_calibration	= True	Vehicle Supply Voltage U300054_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Control Module Not Configured. Sensor has not yet completed a successful aiming process.	Radar sensor address has not been learned and locked in. Additional the following values have not yet been aimed and provided to the radar: azmiuth (left and right), elevation (high, low)	= Fault detected	Vehicle Supply Voltage U300055_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Invalid Incompatible Configuration. APAR (application parameters) Calibration values are outside the valid calibration range.	Control Module or System Configuration not valid such that calibration values are outside the valid calibration range. On initialization, every calibration is range checked to be within specified high and low range limits. If one of these values are out of range, then the APAR (application parameters) is rejected and a default APAR is loaded instead.	= Fault detected	Vehicle Supply Voltage U300056_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Invalid Incompatible Software Component. The calibration table doesn't align properly and is no longer compatible with the OP software.	Software component not compatible with detected hardware/software. For the calibration table, it's checked with a "versioning" system. Another calibration was added to the APAR (application parameters) as a version number. This number increments when the table is modified. The SW has a defined version number as well. If these two match, then it's known that the SW is compatible with the APAR and if they don't this fault is triggered.	= Fault detected	Vehicle Supply Voltage U300057_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Wrong mounting position - the radar is not mounted correctly	Absolute value of Angle Misalignment Any of the following bits of Active Fault are set:	> k_Radar_Misalignment_Out_Of_Range alignment_mode horizontal_alignment_out_of_range vertical_alignment_out_of_range alignment_routine_failed_fault	Vehicle Supply Voltage U300076_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Incorrect Assembly - This DTC indicates a repositioned sensor or wiring fault.	Learned address and current address position mismatch	Active_Fault.bit.sensor_addr_unstable_fault = TRUE	Vehicle Supply Voltage U300095_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	0.10000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Component or System Operation Obstructed or Blocked. This is caused by a radar algorithm detecting blockage on the sensor, keeping it from detecting objects.	The operation of a component is prevented by an obstruction which trigers this fault. This is detected if the immediate environment of the radar does not change for a given period of time, the radar determines that it is blocked and a fault is detected.	= Fault detected	Vehicle Supply Voltage U300097_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Control Module Component or System Operating Condition. For this DTC, it is monitoring the RF (radio frequency) and Internal MCU (microprocessor control unit) temperatures.	Radar internal temperature at threshold for the RF and internal MCU	= Fault detected	Vehicle Supply Voltage U30009A_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
Radar Power Circuit	U3003	Battery Voltage - Circuit Voltage Below Threshold Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using radar information will occur. The default action depends on the downstream consumer. This applie to high and low voltage diagnostics	Radar supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Radar supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Backup Transmissio n Range Command Message Counter Incorrect	C1201	This DTC monitors for an error in communication with the Backup Transmission Range Command Signals.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: Backup Transmission Range Command ARC and PV	 >= 8.00 counts out of >= 10.00 counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Backup Transmission Range Command ARC and PV sample every 50.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Circuit Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 Q impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Circuit High	C1250	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	> 3.8500 g < 3.8500 g (< 0.5 Q impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lateral Acceleration Sensor Performance	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	> 0.5300 g < 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	> 11.00 volts > 11.00 volts = 1 Boolean > 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time > 10.0 seconds, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
				In all cases, the failure count is cleared when controller shuts down				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Not Programmed	P0602	This DTC will be stored if the DEC ECU has not been flash programmed with production software and calibration.	controller not flash programmed calibration	= 1 Boolean	controller normal power up initialization, ignition run crank transtions from low to high service Mode $04 active during one second loop	 = FALSE	at controller power up intitalization one time (one event/ occurance) OR in one second time loop	Type A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECU Long Term Memory Reset	P0603	This DTC detects an invalid NVM which includes a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down.	Static NVM region error detected during initialization				Diagnostic runs at controller power up.	Type A, 1 Trips
			Perserved NVM region error detected during initialization				Diagnostic runs at controller power up.	
			Perserved NVM region error detected during shut down.				Diagnostic runs at controller power down.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECU RAM Failure	P0604	Indicates that the TCM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.40000 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECU Processor Integrity Fault	P0606	Indicates that the TCM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Time new seed not received exceeded			always running	409.594 seconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	18 / 17 counts intermittent. 50 ms/count in the TCM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test enabel cailbration: CPU 1 enabled = 0 CPU 2 enabled = 1 CPU 3 enabled = 0 CPU 4 enabled = 0 CPU 5 enabled = 0 CPU 6 enabled = 0 CPU 7 enabled = 0 CPU 8 enabled = 0 (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	5.00		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is Enabled: 1 (If 0, this test is disabled)	5 / 10 counts or 0.450 seconds continuous; 50 ms/count in the TCM main processor	
			Checks for ECC (error	3 (results in MIL),		Test is Enabled:	variable,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	5 (results in MIL and remedial action)		1 (If 0, this test is disabled)	depends on length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
							P0606_PSW Sequence Sample f(Loop Time) counts 50 ms/count in the TCM main processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		Test is Enabled: 1 (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: **P0606_Last Seed Timeout f (Loop Time)**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECU Processor Integrity Performance	P0607	Indicates that the TCM has detected an internal processor integrity performance.	Performs the failure diagnostic for the offline and online BIST results.			Test is enabled: 1 . (If 0, this test is disabled)	5 counts background task/ count in the TCM main processor	Type A, 1 Trips
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is enabled: 1 . (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is enabled: 1 . (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type A, 1 Trips
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Actuator Supply Voltage Circuit Low	P0658	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	< 0.5 Q impedance between signal and controller ground OR > 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive ON service mode $04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count > 6 counts within sample count of 2,400 counts OR open circuit fail count > 30 counts within sample count of 50 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Torque Managment System - Forced Engine Shutdown	P06AF	This diagnostic is monitoring that the TCM is processing code correctly. The TCM computes the correct pattern sent via a CAN message to the monitoring TCM. When the TCM does not receive a correct pattern or a missing pattern to the monitoring TCM, the DTC is set.	Received pattern from the TCM OR Received malfunction pattern	± expected pattern >= 2 counts	Run Crank Active Time	Run or Crank >= 0.50 seconds	6/12 counts or 2.00 seconds continuous; 25 ms/count in the TCM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Fluid Temperature (TFT) Sensor Performance	P0711	The diagnostic monitor will verify the time to transmission fluid temperature warm up based on the raw transmission fluid temperature sesnor, any intermittent signal that causes multiple unrealistic delta changes (intermittent faults) based on the raw transmission fluid temperature sesnor, and, raw transmission fluid temperature sesnor signal stuck in valid range.	raw transmission fluid temperature and the transmission fluid temperature warm up time has elapsed	< -6.7 °C			transmission fluid temperature warm up time > **transmission fluid temperature warm up time** seconds	Type B, 2 Trips
					diagnsotic monitor enable	= 1 Boolean		
					P0712 NOT fault active			
					P0713 NOT fault active			
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
					warm up test enable	= 1 Boolean		
					TFT rationality diagnostic monitor enabled	= VeTFSR_b_TFT_RatlEnbl		
					driver accelerator pdeal position	> 5.0 %		
					engine torque	> 50.0 Nm		
					engine speed	> 500.0 RPM		
					vehicle speed	> 10.0 KPH		
					engine coolant temperature	> -40.0 °C		
					engine coolant temperature	< 150.0 °C		
					raw transmission fluid temperature	> -273.0 °C		
					raw transmission fluid temperature	< 150.0 °C		
					P2818 fault active	= FALSE		
					P2818 test fail this key on	= FALSE		
					DTCs not fault active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA		
					TFT Warmup Pass P0711 test fail this key on	= FALSE = FALSE		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	> 80.0 °C			sample count > 10 counts evaluate fail temperature threshold, 100 millisecond update rate, if transmission fluid temperature string length above fail threshold increment fail time fail time > 8.0 seconds out of sample time > 12.0 seconds	
					diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active	= 1 Boolean		
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
					intermittent test enable	= 1 Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					propulsion system active	= TRUE		
			raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, update fail time	< 0.0000 °C	diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage run crank voltage stuck in range test enable propulsion system active raw transmission fluid temperature raw transmission fluid temperature	= 1 Boolean > 9.00 volts > 9.00 volts = 1 Boolean = TRUE > -273.0 °C < 150.0 °C	fail time > 600.0 seconds battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0712	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	< 13.000 Q	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean > 9.00 volts > 9.00 volts	fail time > 5.00 seconds out of sample time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0713	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to voltage failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	>284,177.0 Q			fail time > 5.00 seconds out of fail time > 6.00 seconds 1 seconds update rate	Type B, 2 Trips
					diagnostic monitor enable	= 1 Boolean	battery voltage in range time > 0.100 seconds	
					battery voltage	> 9.00 volts		
							run crank voltage in range time > 0.100 seconds	
					run crank voltage	> 9.00 volts		
					run crank voltage in range time			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Performance	P0716	Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission input speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Input Speed Sensor Circuit Low Voltage" DTC will set before P0716, as P0716 is designed to set based on an intermittent raw transmission input speed signal RPM.	delta raw transmission input speed delta raw transmission input speed = raw transmission input speed - last valid raw transmission input speed, 25 millisecond update rate	> 2,000.0 RPM	service mode $04 active diagnostic monitor enable P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE = FALSE	fail time > 1.500 seconds updated fail event count, fail event count > 5 counts, 25 millisecond update rate	Type A, 1 Trips
					last valid raw transmission input speed OR valid raw transmission input speed (before drop event)	> 240.0 RPM > 240.0 RPM	raw transmission input speed time > 2.000 seconds	
					last valid raw transmission input speed updates very 25 milliseconds when stablity time complete as long as (delta delta raw transmission input speed AND raw transmission input speed)	 < 320.0 RPM > 200.0 RPM	 stability time > 0.100 seconds	
					raw transmission output speed accelerator pedal position engine torque engine torque	> 377.0 RPM > 5.0 % < 8,191.9 Nm > 30.0 Nm		
					transmission hydraulic pressure available: engine speed	 > 500.0 RPM	 engine speed time >	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate	**engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Circuit Low Voltage	P0717	Detects no activity in raw transmission input speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure.	raw transmission input speed OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE, update fail time 25 millisecond update rate	< 168.0 RPM < 250.0 RPM	service mode $04 active diagnostic monitor enable run crank voltage service fast learn active run crank voltage P0722 fault active P0723 fault active P077C fault active P077D fault active brake pedal position sesnor must be OBDII to use brake pedal conditional brake pedal position sesnor type brake pedal position P0716 test fail this key on P07BF test fail this key on P07C0 test fail this key on accelerator pedal position engine torque engine torque (transmission current attained gear transmission current attained gear raw transmission output speed OR transmission current attained gear transmission current attained gear raw transmission output speed) P0717 fault active P0717 test fail this key on	= FALSE = 1 Boolean > 5.00 volts = FALSE > 9.00 volts = FALSE = FALSE = FALSE = FALSE = CeBRKR_e_OBD < 70.0 % = FALSE = FALSE = FALSE > 5.0 % >30.0 Nm < 8,191.9 Nm ≤ CeCGSR_e_CR_Fourth > CeCGSR_e_CR_First > 250.0 RPM < CeCGSR_e_CR_Tenth ≥ CeCGSR_e_CR_Fourth > 377.0 RPM	fail time > 4.00 seconds run crank voltage time > 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when: (P0722 fail time high gear exceeds fail threshold OR P0722 fail time low gear exceeds fail threshold) TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled transmission hydraulic pressure available: engine speed DTCs not fault active	= FALSE = FALSE = 0 Boolean = 1 Boolean > 500.0 RPM EngineTorqueEstInaccurate	engine speed time > **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Performance	P0721	The diagnostic monitor determines if the direction TOSS value is coherent based on the on period time of the directional sensor and TOSS raw. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow TOSS raw RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	TOSS raw direction when TOSS transitional period = FALSE AND TOSS raw direction when TOSS transitional period = FALSE OR TOSS raw when TOSS transitional period = TRUE update fail and sample time 6.26 millisecond update rate	# FORWARD # REVERSE > 225.0 RPM	service mode $04 active diagnostic monitor enable TOSS count sample period P0721 fault active P0721 test fail this key on TOSS transitional period detected = FALSE when: on period on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward TOSS transitional period detected = TRUE when: on period on period when direction unknown senor type is directional senor type cailbration	= FALSE = 1 Boolean # 0 counts = FALSE = FALSE > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds = CeTOSR_e_Directional	fail time > 3.500 seconds out of sample time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Low Voltage	P0722	Detects no activity in raw transmission output speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission output speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque, but raw transmission output speed signal RPM remains low. After a sudden drop in raw transmission output speed signal RPM, a race condition can occur between P0722 and "Output Speed Sensor Circuit Intermittent" depending on the true nature of the failure.	raw transmission output speed, update fail time 6.25 millisecond update rate when: attained gear attained gear AND attained gear use high gear fail time threshold ELSE use low gear fail time threshold	< 30.0 RPM ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth	service mode $04 active diagnostic monitor enable when neutral range occurs: (garage shift OR PRNDL OR PRNDL OR range inhibit state) {}{when not neutral range occurs: attained gear attained gear (attained gear engine torque hysteresis high engine torque hysteresis low accelerator pedal position hysteresis high accelerator pedal position hysteresis low) when not neutral range occurs: (attained gear engine torque hysteresis high engine torque hysteresis low accelerator pedal position hysteresis high accelerator pedal position hysteresis low)}	= FALSE = 1 Boolean # COMPLETE = PARK = NEUTRAL # no inhibit active > CeCGSR_e_CR_First < CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth > 30.0 Nm > 20.0 Nm > 3.0 % > 1.5 % ≤ CeCGSR_e_CR_Fourth > 50.0 Nm > 30.0 Nm > 3.5 % > 2.0 %	fail time >4.00 seconds high gear OR fail time > 3.00 seconds low gear Engine Torque criteria met > 0.15 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR {}{Wheel Speed Rationality Enable AND Transfer Case Range Valid AND Vehicle Speed Fault AND Tease state AND Wheel Speed Sensor Present AND Output Speed calculate from wheel speed} TISS/TOSS has single power supply calibration AND TISS AND TISS) OR TISS/TOSS has single power supply calibration AND TISS AND TISS) P0716 test fail this key on P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on PTO check: PTO enable calibration is FALSE OR	= 1.00 Boolean =TRUE = FALSE != Neutral = TRUE >= 100.00 rpm = 0 Boolean < 8,191.9 RPM > 250.0 RPM = 0 Boolean < 8,191.9 RPM > 3,500.0 RPM = FALSE = FALSE = FALSE = FALSE # 1 Boolean	Wheel Speed Rationality met = 0 s counts down from 0.25 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(PTO enable calibration is TRUE AND PTO active) run crank voltage service fast learn active run crank voltage transmission fluid temperature P0723 test fail this key on P077C test fail this key on P077D test fail this key on P0722 fault active P0722 test fail this key on transmission hydraulic pressure available: engine speed DTCs not fault active	= 1 Boolean = TRUE > 5.00 volts = FALSE > 9.00 volts > -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE > 500.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	 run crank voltage time > 25 milliseconds engine speed time > **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Intermittent	P0723	Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission output speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Output Speed Sensor Circuit Low Voltage" DTC will set before P0723, as P0723 is designed to set based on an intermittent raw transmission output speed signal RPM.	delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate Failing criteria depends on below decision tree for failure threshold If 4WD low engaged and wheel speed usage is not enabled Else If Wheel speed usage enabled for failing TOS drop diagnostic Else (Not 4WD and not Wheel Speed usage) If 4WD low is engaged and Wheel speed usage enabled	> 1,755.0 RPM **P0723 Wheel Speed Calc** function of output speed > 650.0 RPM > Above threshold * 2.70	service mode $04 active diagnostic monitor enable transmission engaged state 4WD low state PTC check: PTO enable calibration is FALSE OR (PTO enable calibration is TRUE AND PTO active) run crank voltage service fast learn active run crank voltage P077C test fail this key on P077D test fail this key on when PRNDL is moved to	= FALSE = 1 Boolean # not engaged = 4WD low state previous loop, 25 millisecond update rate # 1 Boolean = 1 Boolean = TRUE > 5.00 volts = FALSE > 9.00 volts = FALSE = FALSE	fail time > 1.500 seconds updated fail event count, fail event count > 5 counts, 25 millisecond update rate transmission engaged state time > **P0723 (MY21) transmission engaged state time threshold** 4WD low change time > 3.0 seconds run crank voltage time > 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					NEUTRAL allow transmission engaged state time before enabling fail evaluation, or, if raw raw transmission output speed is active in NEUTRAL enable fail evaluation:			
					PRNDL OR	= CeTRGR_e_PRNDL_Neutral		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional1 N-D transitional		
					PRNDL OR	= CeTRGR_e_PRNDL_Transitional4 R-N transitional		
					raw transmission output speed OR	> 250.0 RPM		
					last valid raw transmission output speed	> 250.0 RPM		
					determine if raw transmission input speed is stable:			
					((raw transmission input speed - raw transmission input speed previous, 25 millisecond update AND	< 4,095.9 RPM		
					raw transmission input speed) OR	> 200.0 RPM	raw transmission input speed stability time > 2.00 seconds	
					Wheel speed usage enabled for failing TOS drop diagnostic) OR	= TRUE		
					(TISS/TOSS has single power supply calibration	= 0 Boolean	no time required	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND raw transmission input speed)	= 0.0 RPM		
					select delta RPM fail theshold: (4WD low state AND 4WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold	 = TRUE = TRUE		
					last valid raw transmission output speed OR valid raw transmission output speed (before drop event)	> 36.0 RPM > 36.0 RPM	raw transmission output speed time > 2.00 seconds	
					Wheel speed usage enabled for failing TOS drop diagnostic AND TOS - Calculated TOS from Wheel Speed	= TRUE > 300.00 rpm		
					last valid raw transmission output speed updates every 25 milliseconds when stablity time complete as long as (delta delta raw transmission output speed AND raw transmission output speed)	 < 140.0 RPM > 36.0 RPM	 stability time > 0.100 seconds	
					transmission hydraulic pressure available: enoine soeed	> 500.0 RPM	engine speed time >	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate	**engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Torque Converter Clutch (TCC) System Performance - GR10 specific	P0741	The GR10 diagnostic monitor detects the transmission torque converter control valve failed hydraulically on. If the control valve is stuck, the torque converter will drain down, resulting in an excessive K factor above expected value	calculated transmission torque converter K factor = engine speed / SQR (engine torque) increment fail count 25 millisecond update rate	> **P0741 GR10 torque converter K factor fail limit** see supporting table			fail count > 4 counts in 75 count sample 25 millisecond update rate	Type A, 1 Trips
					diagnostic monitor enable	= 1 Boolean		
					(TCC stuck off enable OR TCC stuck on enable)	= 1 Boolean = 1 Boolean		
					hydraulic pressure available:			
					engine speed	> 500.0 RPM	engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting table	
					battery voltage	> 9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	> 9.00 volts	run crank voltage time > 0.100 seconds	
					engine speed status	*t* INVALID		
					PRNDL	# PARK		
					PRNDL	# NEUTRAL		
					Commanded Gear	# PARK		
					Commanded Gear	# NEUTRAL		
					transmission fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.0 °C		
					engine speed	> 1,500.0 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					intrusive shift active (intrusive shift due to fault maturing for clutch pressure control solenoid stuck off/on P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821) P0741 test fail this key on range shift state attained gear slip engine torque accelerator pedal position accelerator pedal position engine acceleration transmission torque converter speed ratio (transmission turbine shaft speed / engine speed) DTCs not fault active DTCs not fault pending	= FALSE = FALSE = range shift complete (steady state gear) < 75.0 RPM > 5.00 Nm > 0.00 % < 100.0 % > -200.0 RPM/sec < 0.900 AcceleratorPedalFailure EngineTorqueEstInaccurate CrankSensor_FA P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D P0722, P0723, P0716, P0717, P07BF, P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Stuck Off (GR10)	P0746	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch oressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) **************************** enable C1 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C1 (GR10 CB123456R) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C1 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C1 clutch pressured map	= mapped to line pressure, C1 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Stuck On	P0747	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C1 clutch slip speed OR shift type is garage shift: C1 clutch slip speed ELSE shift is another type: C1 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 100.00 RPM < 50.0 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.150 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C1 CB123456R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) ******************************	> 10 kPa = TRUE = TRUE ******************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C1 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C1 off going clutch command pressure)	< 350.0 kPa	closed throttle upshift: **C1 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C1 exhaust delay open throttle power on up shift** garage shifts: **C1 exhaust delay garage shift** closed throttle downshift: **C1 exhaust delay closed throttle down shift** negative torque upshift: **C1 exhaust delay negative torque up shift** open throttle downshift: **C1 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,191.8 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type)	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active	= FALSE		
					AND shift type enable cal for aaraae shift	= 1 (0 will enable. 1 will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending	enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					******************************	********************** *****r*r*r*r*r		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Stuck Off (GR10)	P0776	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C2 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	******************************	******************************	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update	Type A, 1 Trips
					system-level enables:			
					use battery voltage calibration is FALSE OR	= 1 Boolean		
					(use battery voltage calibration is TRUE AND	= 1 Boolean		
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE OR	= 1 Boolean		
					(use run crank voltage calibration is TRUE AND	= 1 Boolean		
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch oressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) **************************** enable C2 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C2 (GR10 CB128910R) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C2 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C2 clutch pressured map	= mapped to line pressure, C2 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Stuck On	P0777	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C2 clutch slip speed OR shift type is garage shift: C2 clutch slip speed ELSE shift is another type: C2 clutch slip speed update fail time 6.25 milliscond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			******************************	******************************	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C2 CB128910R clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available (hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) **************************** range shift state diagnostic clutch test transmission output shaft speed ((C2 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE > 10 kPa = TRUE = TRUE ***************************** # range shift complete = OFF GOING CLUTCH TEST > 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C2 off going clutch command pressure)	< 350 kPa	closed throttle upshift: **C2 exhaust delay open throttle power on up shift** open throttle upshift: **C2 exhaust delay open throttle power on up shift** garage shifts: **C2 exhaust delay garage shift** closed throttle downshift: **C2 exhaust delay closed throttle down shift** negative torque upshift: **C2 exhaust delay negative torque up shift** open throttle downshift: **C2 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR **C6 Torque-Based Pressure Clio**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C2 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					*****************************	*****************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable, 1 will enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending	= NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					*****************************	*****************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Low	P077C	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.2500 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P077D fault active service fast learn run crank voltage battery voltage P077C fault active P077C test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit High	P077D	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 Q impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P077C fault active service fast learn run crank voltage battery voltage P077D fault active P077D test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Stuck Off (GR10)	P0796	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C3 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch oressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** enable C3 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C3 (GR10 C23457910) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C3 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C3 clutch pressured map	= mapped to line pressure, C3 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Stuck On	P0797	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C3 clutch slip speed OR shift type is garage shift: C3 clutch slip speed ELSE shift is another type: C3 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 50.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.35 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C3 C23457910 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					*****************************	******************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C3 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable. 0 to	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C3 off going clutch command pressure)	disable) < 350 kPa	closed throttle upshift: **C3 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C3 exhaust delay open throttle power on up shift** garage shifts: **C3 exhaust delay garage shift** closed throttle downshift: **C3 exhaust delay closed throttle down shift** negative torque upshift: **C3 exhaust delay negative torque up shift** open throttle downshift: **C3 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE ± clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C3 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type) OR	# Garage shift = **Clutch Stuck On Shift Type Enable** (0 table value will disable, 1 will enable)		
					(Intrusive shift active AND shift tvoe enable cal for	= FALSE = 1 (0 will enable. 1 will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ******************************* DTCs not fault pending	enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions) ******************************* P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					******************************	******************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verifv which			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.2500 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P07C0 fault active service fast learn run crank voltage battery voltage P07BF fault active P07BF test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 Q impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P07BF fault active service fast learn run crank voltage battery voltage P07C0 fault active P07C0 test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 > 1.00 seconds	Emissions Neutral Diagnostics - Type C
			switch state update fail time 2 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE	fail time 2 > 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downshift Switch Circuit	P0816	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 > 1.00 seconds	Emissions Neutral Diagnostics - Type C
			switch state update fail time 2 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean > 5.00 volts > 25 milliseconds > 9.00 volts = FALSE	fail time 2 > 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 100 millisecond update rate	= illegal (voltage out of range)	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage P1761 fault active (P0826 fault active OR P0826 fault active test fail this key on)	= FALSE = 1 Boolean > 5.00 volts > 9.00 volts = FALSE = FALSE = FALSE	fail time > 60.00 seconds run crank voltage time > 25 milliseconds	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	> 200 K Q impedance between signal and controller ground			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	>1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)	> 12.5 milliseconds	
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit Low	P0962	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode))	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit High	P0963	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit Low	P0966	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit High	P0967	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit Low	P0970	Controller specific circuit diagnoses 9 speed CB38,10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit High	P0971	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Wheel Speed Sensor Sequence Number Incorrect (Emissions Neutral Diagnostic)	P15FD	This DTC monitors wheel speed signals for an incorrect sequence Emission neutral default state sets wheel speed signals = 0.0.	Communication of the wheel speed sequence numbers from the ABS / Brake Control Module is incorrect. A complete set of sequence numbers has not been received for and this state is continuous for out of a total sample time of	> 10.00 seconds >2.00 seconds > 12.00 seconds	Sequence Number Error DTC is enabled Power Mode Run/Crank Ignition Voltage Driven and non-driven wheel rotational status is currently being received and not failsoft.	Enabled = Run or Crank >=11.00 Volts	Diagnostic executes in 25ms loop.	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Redundant Memory Performance	P16F3	The diagnostic monitor is a rationalization of command values: command clutch pressures, command gear, and commanded direction. The monitor is broken up into three fault detection routines, command pressure (tie up) fault detection, command gear/shift fault detection, and commanded direction. The command pressure (tie up) fault detection is designed to verify the number of clutches applied in a given gear state is limited, in order to prevent a transmission internal mechanical tie-up condition. A condition which could lead to a vehicle deceleration above the design safety metric. If commanded clutch pressures are above a threshold which would allow multiple clutches to carry torque, the clutch is considered applied, otherwise the clutch is considered released. If there are more clutches applied, via the commanded clutch pressures, in a given gear state than is	For each combination of clutches which can lead to an output lock: Commanded Clutch PCS Pressure OR For each combination of clutches which can lead to a mult-clutch tie-up: Commanded Clutch PCS Pressure	≥ **Cmnd Tie Up Monitor Output Lock Thresh** * **Clutch PCS Pressure Gain** + **Clutch PCS Pressure Offset** transfer case range is 4WD Low: ≥ **Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo** * **Clutch PCS Pressure Gain** + **Clutch PCS Pressure Offset** Else ≥ **Cmnd Tie Up Monitor Multi-Clutch Thresh** * **Clutch PCS Pressure Gain** +				Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		rational, one or more of the clutch pressure command values are in error. Given rate of change of transmission output shaft speed, command gear state clutches and clutch hydraulic fill volumes, those clutches in transition from the hydraulic released state to the hydraulic applied state and from the hydraulic applied state to the hydraulic released state, the rationality detects any number of command clutch pressures above a threshold, that are simultaneously active to cause a vehicle deceleration above the design safety metric. The command gear/ shift fault detection is designed to verify the commanded gear will not induce a downshift resulting in a gear state that is erroneous given vehicle operating conditions. The detection rationalizes the command gear against a minimum gear, highest gear ratio, for given vehicle speed and transfer case range	if above criteria met, increment fail timer by 3.125 6.25 ms update rate	**Clutch PCS Pressure Offset**	commanded tie up monitor enable calibration vehicle speed OR commanded tie up fault pending OR (vehicle speed AND monitor enabled in previous loop) High Side Driver 1 On High Side Driver 2 On Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) Number of fill factor conditions below which need to be met Clutch 1 volume fill factor Clutch 2 volume fill factor Clutch 3 volume fill factor Clutch 4 volume fill factor Clutch 5 volume fill factor Clutch 6 volume fill factor SOWC volume fill factor (GF9 only) outout shaft deceleration	= 1 (1 to enable, 0 to disable) > 5.0 KPH = TRUE > 5.0 KPH = TRUE = TRUE = TRUE = FALSE = TRUE > 8.0 KPH = 4 Filled Clutches > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 Transfer case range is 4WD Lo: < -471.9 RPM/sec	when fail timer reaches 100, set DTC >2.50 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		The command direction fault detection is designed to verify the clutches commanded on will result in the commanded direction (e.g. reverse clutches are being commaned on when the commanded range is reverse). This is used to prevent an incorrect direction safety hazard.			DTCs Not Fault Active DTCs Not Test Failed This Key On	Else < -174.8 RPM/sec P077C, P077D P0723, P0722		
			Commanded Gear AND at least one of the following: Previous Loop Commanded Gear and current loop commanded OR current commanded gear and previous loop commanded gear OR incorrect downshift fail timer if above conditions are met, increment incorrect downshift fail timer 6.25 ms update rate Alternatively, if commanded gear increment invalid commanded gear fail timer	< **Shift Monitor Lowest Allowed Gear** > Current Loop Commanded Gear (i.e a downshift) = a forward, locked gear = a forward, locked gear ± a forward, locked gear >0.0 = NULL	command shift monitor	= 1 (1 to enable, 0 to	when incorrect downshift fail timer reaches 4.63 sec, set DTC when invalid fail timer reaches 4.63 sec, set DTC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			6.25 ms update rate		enable calibration Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On	disable) = FALSE = TRUE > 8.0 KPH = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B	 >2.50 sec	
			Criteria based on driver requested range: Drive: An invalid combination of drive clutches commanded on* driver requested range Incorrect drive enable calibration Incrorrect drive disable calibration Reverse: An invalid combination of reverse clutches commanded on* driver requested range	**Illegal Drive Clutch = Combinations** = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = **Illegal Reverse Clutch Combinations** = Reverse			Fault pending fail timer **Clutch Connectivity Wrong > Direction FP** Fail time based on driver requested range: **Incorrect Drive Fail Time** **Incorrect Reverse Fail Time** **Incorrect Neutral Fail Time** **Incorrect Park Fail Time** 6.25 ms update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Incorrect reverse enable calibration Incrorrect reverse disable calibration Neutral: An invalid combinatio of neutral clutches commanded on* driver requested range Incorrect neural enable calibration Incrorrect neutral disable calibration Park: An invalid combination of reverse clutches commanded on* driver requested range Incorrect park enable calibration Incrorrect park disable calibration	= 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to enable) = **Illegal Park-Neutral Clutch Combinations** = Neutral = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = **Illegal Park-Neutral Clutch Combinations** = Park = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable)	Current driver requested range (vehicle speed AND vehicle speed OR Fail Timer) clutch connectivity detection enable calibration clutch connectivity monitor enable OR clutch connectivity monitor disable Service Fast Learn OR (Service Fast Learn AND Vehicle Speed) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On * Note, clutch is considered "on" when the following conditions are met: Clutch commanded	= previous driver requested range > -6.00 KPH > 6.00 KPH > 0.0 = 1 (1 to enable, 0 to disable) = 1 (1 to enable, 0 to disable = 0 (0 to enable, 1 to disable) = FALSE = TRUE > 8.0 KPH = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B ≥	≥ **Incorrect Direction Range Change Delay Time** >2.50 sec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					pressure AND Current clutch pressure command * 0.25 + 1st derivative of pressure command * 0.25 + 2nd derivative of pressure command * -0.25 + 3rd derivative of pressure command * -0.25	**Clutch Connectivity C1 On Threshold OLD** OR ≥ **Clutch Connectivity C2 On Threshold OLD** OR ≥ **Clutch Connectivity C3 On Threshold OLD** OR ≥ **Clutch Connectivity C4 On Threshold OLD** OR ≥ **Clutch Connectivity C5 On Threshold OLD** OR ≥ **Clutch Connectivity C6 On Threshold OLD** OR ≥ **Clutch Connectivity C7 On Threshold OLD** = 0.0 OR > -1.00 kPa		
			ratio monitor fault pending	= TRUE			increment fail timer by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Output speed direction OR Output speed direction Plus following criteria based on driver requested range: Drive: driver requested range Incorrect drive enable calibration Incrorrect drive disable calibration Reverse: driver requested range Incorrect reverse enable calibration Incrorrect reverse disable calibration Neutral: driver requested range Incorrect neural enable calibration Incrorrect neutral disable calibration Park: driver requested range	= FORWARD = REVERSE = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = Reverse = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to enable) = Neutral = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = Park	****************************** If all conditions below are met, increment ratio monitor fault pending timer: vehicle speed OR vehicle speed (note: fault pending will remain latched if vehicle speed max thresholds are exceeded) Monitor Armed	****************************** > 0.50 AND < 6.00 KPH <-0.50 AND >-6.00 KPH = TRUE	**Ratio Monitor Fail Increment Rate (Percent per Loop)** when timer reaches 100, set fault pending Fail time based on driver requested range (once fault pending has matured): **Incorrect Drive Fail Time** **Incorrect Reverse Fail Time** **Incorrect Neutral Fail Time** **Incorrect Park Fail Time** 6.25 ms update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Incorrect park enable calibration Incrorrect park disable calibration	= 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable)	Measured output speed direction Input speed default direction Current driver requested range based on PRNDL position: driver requested range AND transmission measured speed ratio AND Loop-to-loop change in measured ratio AND (Direction By Ratio OR Direction By Clutch Slip) driver requested range AND transmission measured speed ratio AND Loop-to-loop change in measured speed ratio AND (Direction By Ratio OR Direction By Clutch Slip) ****************************** Monitor Armed Enables: if Range Shift enable cal: THEN	= REVERSE or FORWARD = REVERSE or FORWARD = previous driver requested range = Reverse > 0.40 > -8.00 = FORWARD = a FORWARD Gear = Drive < -0.40 < 8.00 = REVERSE = REVERSE ****************************** = 0 (1 to enable, 0 to disable)	**≥ Incorrect Direction Range Change Delay Time**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Range Shift State	= Range Shift Complete		
					OR			
					if Attained Gear enable cal:	= 0 (1 to enable, 0 to disable)		
					THEN			
					Attained Gear	# Neutral AND # Park		
					ALSO			
					Engine Speed	> 400 RPM		
					Ratio Monitor enable cal	= 1 (1 to enable, 0 to disable)		
					OR			
					Ratio Monitor disable cal	= 0 (0 to enable, 1 to disable)		
					*****************************	*****************************		
					Direction By Ratio:			
					Direction By Ratio Enable cal	= 1 (1 to enable, 0 to disable)		
					(vehicle speed	> 0.50 KPH		
					OR			
					vehicle speed)	< -0.50 KPH		
					WHEN:			
					Measured output speed direction	= reverse		
					AND			
					Absolute measured gear ratio	> 4.80 AND < 4.92		
					THEN			
					Direction by Ratio	= REVERSE		
					ELSE WHEN			
					Measured output speed direction	= forward		
					AND			
					Absolute measured gear ratio	> 4.65 AND < 0.66		
					THEN			
					Direction bv Ratio	= FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					******************************	******************************		
					Direction by Clutch Slip:			
					C1 clutch slip valid	= TRUE		
					C2 clutch slip valid	= TRUE		
					C5 clutch slip valid	= TRUE		
					C3C4 dual clutch slip valid	= TRUE		
					C3C6 dual clutch slip valid	= TRUE		
					C4C6 dual clutch slip valid	= TRUE		
					Direction by Clutch Slip Enable cal	= 1 (1 to enable, 0 to disable)		
					(vehicle speed	> 0.50 KPH		
					OR			
					vehicle speed)	< -0.50 KPH		
					for each clutch: current clutch slip	**Ratio Monitor Slip < Threshold** (if slip condition met, clutch held = 1, else held = 0)		
					clutch held combination matches a valid gear in:	**Ratio Monitor Clutch States**		
					******************************	******************************		
					General enables:			
					Genral Ratio Monitor Detection enable cal	= 1 (1 to enable, 0 to disable)		
					Transmission Type	= RWD 10 Spd Automatic		
					Service Fast Learn	= FALSE		
					OR		>2.50 sec	
					(Service Fast Learn	= TRUE		
					AND			
					Vehicle Speed)	> 8.0 KPH		
					Hioh Side Driver 1 On	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					High Side Driver 2 On	= TRUE		
					DTCs Not Fault Pending	P0716, P0717, P07BF, P07C0, P0721, P0722, P0723, P077C, P077D, P172A, P172B, P1783, P17CE		
					DTCs Not Fault Active	P0716, P0717, P07BF, P07C0, P077C, P077D, P0721, P17CE, P1783		
					DTCs Not Test Failed This Key On	P0721, P0722, P0723, P172A, P172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Forward Direction Error	P172A	The TOS sensor is a directional sensor, and raw TOS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TOS direction is not a forward gear but attained gear is a forward gear, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error.	(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	± forward ± forward **intermediate speed sensor 1 or 2** # **predicted direction** **intermediate speed sensor 1 or 2** *t* **predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality =enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			(raw TOS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# forward **intermediate speed sensor 1 or 2** # **predicted direction** **intermediate speed sensor 1 or 2** # **predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available**	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	± forward ± forward **intermediate speed sensor 1 or 2** # **predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time	> 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	± forward # forward **intermediate speed sensor 1 or 2** *t* **predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(raw TOS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# forward **intermediate speed sensor 1 or 2** **# predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						engine speed time for transmission hydraulic pressure available		
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		
			(raw TOS direction OR intermediate speed sensor 1 direction raw) AND attained gear AND attained gear	# forward **intermediate speed sensor 1 or 2** **# predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete) enable time	= range shift complete > 1.00 seconds		
			(raw TOS direction OR raw TIS direction) AND attained gear AND attained gear	# forward ± forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			raw TOS direction attained gear	# forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	> 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Control System - Shift Limiting Active	P175E	The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time # 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault DTCs and performance fault DTCs. The latent fault diagnostic monitor	unintended decel test system fault unintended decel test system fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND unintended deceleration latent fault fail count)) UPDATE unintended decel test system fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE continue execute only IF: calibrated for a back up signal to longitudinal acceleration and total brake axle torque using and wheel speed or TOSS OR U0121 (loss comm ABS/EBCM) occurs OR brake pedal position fault THEN SET unintended decel test system fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = CeTSDD_e_WhlSpdBackUp	unintended decel test system fault time > 10.0 seconds UPDATE unintended deceleration latent fault fail count SET unintended decel test system fault = TRUE unintended deceleration latent fault fail count > 100 counts 25 millisecond update rate	Type A, 1 Trips
			ECM range sensor fault ECM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria	= 0 Boolean > 5.00 volts > 12.5 milliseconds = FALSE	ECM range sensor fault time > 10.0 seconds UPDATE ECM range sensor latent fault fail count SET ECM range sensor fault = TRUE	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	AND ECM range sensor latent fault fail count)) UPDATE ECM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= 100 counts	met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF ECM P2802 fault active OR ECM P2803 fault active SET ECM range sensor fault occur = TRUE	 = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	 ECM range sensor latent fault fail count > 100 counts 25 millisecond update rate	
			TCM range sensor fault TCM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND TCM range sensor latent fault fail count)) UPDATE TCM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 255 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF TCM P0707 fault active OR TCM P0708 fault active SET TCM range sensor fault occur = TRUE	= 0 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	TCM range sensor fault time > 409.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count > 255 counts 25 millisecond update rate	
			TOSS fault TOSS fault occur RunCrankVoltageMet (*default gear option	= FALSE = TRUE = TRUE = FALSE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage	= 1 Boolean > 5.00 volts	TOSS fault time > 10.0 seconds UPDATE TOSS latent fault fail count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			active OR (*default gear option active AND TOSS sensor latent fault fail count)) UPDATE TOSS fault time ‘default gear option active occurs when emission MIL active due to transmission default gear	 = TRUE = 100 counts	for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on SET TOSS fault occur = TRUE	> 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	SET TOSS fault = TRUE TOSS latent fault fail count > 100 counts 25 millisecond update rate	
			tie-up fault tie-up fault occur RunCrankVoltageMet (‘default gear option active OR (‘default gear option active AND tie-up latent fault fail count)) UPDATE tie-up fault time ‘default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	tie-up fault time > 10.0 seconds UPDATE tie-up latent fault fail count SET tie-up fault = TRUE tie-up latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					SET tie-up fault occur = TRUE			
			trans range fault trans range fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE trans range fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 200 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF [(P0717 or P07C0 or P07BF fault active or P077D or P077C fault active or P723 test fail this key on or P0723 or P077D or P077C or P0722 fault pending or P0716or P07C0 or P07BF or P0717fault pending or P172B or P172Aor P0721 fault pending or P1783 or P17CE fault active or	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE	trans range fault time > 10.0 seconds UPDATE trans range latent fault fail count SET trans range fault = TRUE trans range latent fault fail count > 200 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P1783 or P17CE fault pending or P172A or P172B test fail this key on or P0721 fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] OR [(P176C orP160E or P0963 or P078F or P0707 fault pending or P18AA fault active) AND (safety diasble cal not FALSE OR safety enable cal TRUE)] SET trans range fault occur = TRUE	= TRUE = TRUE = TRUE = 0 Boolean = 1 Boolean = TRUE = TRUE = 0 Boolean = 1 Boolean		
			tie-up test disable fault tie-up test disable fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up test latent fault fail count)) UPDATE tie-up test latent fault time *default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds	tie-up test latent fault time > 10.0 seconds UPDATE tie-up test latent fault fail count SET tie-up test disable fault = TRUE tie-up test latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			occurs when emission MIL active due to transmission default gear		IF EngineTorqueEstInaccurate AcceleratorPedalFailure OR CrankSensor_FA OR P2534 fault active OR (P0707 test fail this key on OR P0707 fault active OR P0708 test fail this key on OR P0708 fault active OR P2805 fault active OR P27EE fault active OR P27EB fault active OR P27ED fault active OR P17F7 fault active OR P17F5 fault active OR P17F6 fault active OR P17FC fault active OR P17FA fault active OR P17FB fault active) OR (P0716 fault pending, fault active, test fail this key on OR P0717 fault pending, fault active, test fail this key on OR P0721 fault pending, fault active, test fail this key on OR P0722 fault pending, fault active, test fail this key on OR P0723 fault pending, fault active, test fail this key on OR P077B fault oendina, fault	= TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on	= TRUE		
					OR			
					P077C fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P077D fault pending, fault	= TRUE		
					active, test fail this key on	= TRUE		
					OR			
					P07BF fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P07C0 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P172A fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P172B fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P176B fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P176C fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P176D fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P1783 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P178F fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P17C4 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P17C5 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P17C6 fault oendino, fault	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on OR P17C7 fault pending, fault active, test fail this key on OR P17CC fault pending, fault active, test fail this key on OR P17CD fault pending, fault active, test fail this key on OR P17CE fault pending, fault active, test fail this key on OR P17D3 fault pending, fault active, test fail this key on OR P17D6 fault pending, fault active, test fail this key on) SET tie-up test disable fault occur = TRUE	 = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Range/ Performance	P176B	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	deltal =ABS (transmission input speed - (transmission output speed * gear ratio commanded)) update faiil time 25 millisecond update rate	> 10.0 RPM	diagnostic monitor enable speed sesnor configuration calibration is single OR dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ****************************** delay time updates when: estimated transmission intermediate speed (transmission input	= 1 Boolean = CeTNSR_e_NSPD_Dual SpdSnsr **P176B ratio calibration = when not REVERSE** see supporting tables **P176B ratio calibration = when REVERSE** see supporting tables ****************************** ≥ **P176B minimum estimated transmission intermediate speed to enable fail evaluation**	fail time > **P176B intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count > **P176B intermediate speed sensor fail count threshold** see supporting tables ******************* delay time >	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					speed / ratio calibration) with transmission input speed input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with with attained gear ***************************** transmission input speed transmission output speed neutral idle mode range shift state P0716 fault active P0717 fault active P07BF fault active P07C0 fault active P0722 fault active P0723 fault active P077C fault active P077D fault active P176C fault active P176D fault active battery voltage	see supporting tables **P176B minimum transmission input speed to enable fail** **> evaluation** see supporting tables **P176B holding clutch** **= states** see supporting tables = REVERSE OR = 1st thru 10th ***************************** > 240.0 RPM > 36.0 RPM = nuetral idle mode ON = range shift complete = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 9.00 volts = FALSE	**P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active run crank voltage transmission hydraulic pressure available: engine speed	> 9.00 volts > 500.0 RPM	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Low	P176C	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.25 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P176D fault active service fast learn run crank voltage battery voltage P176C fault active P176C test fail this key on	= FALSE = 1.00 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.05 seconds, update fail count, fail count > 40.00 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit High	P176D	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.75 volts (< 0.5 Q impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P176C fault active service fast learn run crank voltage battery voltage P176D fault active P176D test fail this key on	= FALSE = 1.00 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.05 seconds, update fail count, fail count > 40.00 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Direction Not Plausible - Forward	P1783	The TIS sensor is a directional sensor, and raw TIS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TIS direction is not reverse but attained gear is reverse, or, if the raw TIS direction is not forward but attained gear is a forward gear, the raw TIS direction is in error.	raw TIS direction AND attained gear	*t* FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			raw TIS direction AND attained gear AND attained gear	* FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 1 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** # FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2 # predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 1.00 seconds		
			intermediate speed sensor 2 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** # **predicted direction** # FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** **± predicted direction** **intermediate speed sensor 1 or 2** **# predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND	**intermediate speed sensor 1 or 2** **# predicted direction** **intermediate speed sensor 1 or 2** **± predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 1 Direction Not Plausible - Forward	P178F	The intermediate speed sensor 1 is a directional sensor, and raw intermediate speed sensor 1 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 1 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 1 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 1 directional is in error.	intermediate speed sensor 1 direction raw AND attained gear	**intermediate speed sensor 1 or 2 # predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 1 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 # predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 1 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time			
			intermediate speed sensor 1 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** # FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	**intermediate speed sensor 1 or 2 # predicted direction** **intermediate speed sensor 1 or 2 ± predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** # **predicted direction** **intermediate speed sensor 1 or 2** # **predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear	**intermediate speed sensor 1 or 2** **± predicted direction** **intermediate speed sensor 1 or 2** **# predicted direction** *t* FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND	**intermediate speed sensor 1 or 2** **# predicted direction** **intermediate speed sensor 1 or 2** **± predicted direction** * *VQWNKRV*	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			attained gear AND attained gear	> 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 2 Performance	P17C5	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	when: (intermediate speed sensor raw direction when transitional period = FALSE AND intermediate speed sensor raw direction when transitional period = FALSE) OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time	# FORWARD # REVERSE **P17C5 P17D3 intermediate speed > sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17C5 fault active OR P17C5 test fail this key on senor type cailbration (senortype is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean # 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_DualSpdSnsr > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time > 3.500 seconds out of sample time > 5.000 seconds 6.26 millisecond update	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 2 Direction Not Plausible - Forward	P17C6	The intermediate speed sensor 2 is a directional sensor, and raw intermediate speed sensor 2 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 2 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 2 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 2 directional is in error.	intermediate speed sensor 2 direction raw AND attained gear	**intermediate speed sensor 1 or 2 # predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 2 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			intermediate speed sensor 2 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** # **predicted direction** * FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable time	> 1.00 seconds		
			intermediate speed sensor 2 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2 ± predicted direction** # FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	**intermediate speed sensor 1 or 2 # predicted direction** **intermediate speed sensor 1 or 2 # predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# **intermediate speed sensor 1 or 2 predicted direction** # **intermediate speed sensor 1 or 2 predicted direction** > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear	= **speed sensor directional rationality enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P0721 Fault Active range shift state (auto trans shift complete) enable time	= FALSE = range shift complete > 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw OR TIS direction) AND attained gear	**intermediate speed sensor 1 or 2 # predicted direction** **intermediate speed sensor 1 or 2 # predicted direction** # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed	**intermediate speed sensor 1 or 2 # predicted direction** **intermediate speed sensor 1 or 2 ± predicted direction**	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			sensor 2 direction raw OR TIS direction) AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	> 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds > 9.00 volts > 0.100 seconds = FALSE > 9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Intermediate Speed Sensor B Circuit Low	P17CC	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.250 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P17CD fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CC fault active OR P17CC test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time > 0.050 seconds, update fail count 12.5 millisecond update rate fail count > 40 counts 12.5 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Intermediate Speed Sensor B Circuit High	P17CD	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.750 volts (< 0.5 Q impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P17CC fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CD fault active OR P17CD test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time > 0.050 seconds, update fail count 12.5 millisecond update rate fail count > 40 counts 12.5 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Direction Error	P17CE	The diagnostic monitor determines if the direction transmission input shaft speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	input shaft speed sesnor raw direction when transitional period = FALSE AND input shaft speed sesnor raw direction when transitional period = FALSE OR input shaft speed sesnor raw when transitional period = TRUE update fail and sample time, update rate defined in Secondary Parameters	# FORWARD # REVERSE > 225.0 RPM	determine update rate: 6.26 millisecond update rate calibration, TRUE, update rate = 6.25 millisecond FALSE, update rate = 25 millisecond service mode $04 active diagnostic monitor enable input shaft speed sesnor count sample period senor type calibration (senor type is directional) P17CE fault active OR P17CE test fail this key on transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= 1 Boolean = FALSE = 1 Boolean # 0 counts = CeTISR_e_Directional = FALSE = FALSE > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time > 3.500 seconds out of sample time > 5.000 seconds update rate defined in Secondary Parameters	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intermediate Speed Sensor 1 Direction Error	P17D3	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	intermediate speed sesnor raw direction when transitional period = FALSE AND intermediate speed sesnor raw direction when transitional period = FALSE OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time 6.26 millisecond update rate	# FORWARD # REVERSE **> P17C5 P17D3 intermediate speed sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17D3 fault active OR P17D3 test fail this key on senor type cailbration (senortype is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean # 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_DualSpdSnsr > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time > 3.500 seconds out of sample time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Intermediate Speed Sensor B Circuit Range/ Performance	P17D6	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	deltal =ABS (transmission input speed - (transmission output speed * gear ratio commanded)) AND delta2 = ABS (transmission input speed - (transmission intermediate speed * ratio calibration)) update faiil time 25 millisecond update rate	> 10.0 RPM > **P17D6 intermediate speed sensor fail RPM threshold** see supporting tables	diagnostic monitor enable speed sesnor configuration calibration is dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ****************************** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration) with	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr = **P17D6 ratio calibration when not REVERSE** see supporting tables = **P17D6 ratio calibration when REVERSE** see supporting tables ****************************** ≥ **P17D6 minimum estimated transmission intermediate speed to enable fail evaluation** see supporting tables	fail time > **P17D6 intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count > **P17D6 intermediate speed sensor fail count threshold** see supporting tables ******************* delay time >	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission input speed	≥ **P17D6 minimum transmission input speed to enable fail evaluation** see supporting tables	**P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation** see supporting tables	
					input speed sensor ready based on commaned gear and transmission intermediate speed sensor (state output must be FALSE to enable fail evaluation) with	= **P17D6 holding clutch states** see supporting tables		
					with attained gear	= REVERSE OR = 1st thru 10th		
					•k'k'kicit'kidcicickicicicick'kicicic'ic'k'kickic'k'kic	******************************		
					transmission input speed	> 240.0 RPM		
					transmission output speed	> 36.0 RPM		
					neutral idle mode	= nuetral idle mode ON		
					range shift state	= range shift complete		
					P0716 fault active	= FALSE		
					P0717 fault active	= FALSE		
					P07BF fault active	= FALSE		
					P07C0 fault active	= FALSE		
					P0722 fault active	= FALSE		
					P0723 fault active	= FALSE		
					P077C fault active	= FALSE		
					P077D fault active	= FALSE		
					P17CC fault active	= FALSE		
					P17CD fault active	= FALSE		
					battery voltage	> 9.00 volts		
					service fast learn active	= FALSE		
					run crank voltage	> 9.00 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission hydraulic pressure available: engine speed	> 500.0 RPM	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds engine speed time > **engine speed time for transmission hydraulic pressure available** see supporting tables	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch A Circuit/Open	P17F5	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 0.41 volts < 1.500 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch A Circuit Low	P17F6	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch A Circuit High	P17F7	The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit.	raw sensor voltage	> 2.530 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch B Circuit/Open	P17FA	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.260 volts < 1.500 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch B Circuit Low	P17FB	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battey voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch B Circuit High	P17FC	The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit.	raw sensor voltage	> 2.530 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Stuck On (GR10 Only)	P187D	This diagnostic monitor rationalizes the driver ETRS command direction of "out of PARK" against the actual park valve position, as the park valve position is measured by the park valve position sensor A or B.	when: out of park commanded only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating out of park OR two valid park sensors (Park Sensor A AND Park Sensor B) not indicating out of park transition delay for commanded park valve transition (not required for steady state commanded out of park conditions) increment fail time when fail time threshold met, increment fail count	 ± Park = Park = Park ≥ **P187D P18E7 Park to Out Of Park Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) (mode valve A commanded high and mode valve A confirmed high) OR mode valve related fault disabled confirmation (P18AAOR P18AB OR P27EC Test Fail This Key) OR (P27EB OR P27ED OR P27EE Fault Active) pump out available (engine speed for	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = TRUE = TRUE = TRUE	steady state fail time > 0.25 seconds OR transition fail time > 0.25 seconds fail count > 2 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park (transition) or maintain out of park (steady state)	> 250 RPM **Pump Out Available > Transition Time** > 100.00 kPa > 1,000.00 kPa > 500.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Stuck Off (GR10 Only)	P187E	This diagnostic monitor rationalizes the driver ETRS command direction of "PARK" against the actual park valve position, as the park valve position is measured by the mode valve position sensor A and B.	when: park commanded only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating park OR two valid park senssors sensors (Park Sensor A AND Park Sensor B) not indicating park transition delay for commanded park valve transition OR transition delay for commanded park valve transition with min line (not required for steady state commanded park conditions) increment fail time when fail time threshold met, increment fail count	= Park * Park ± Park ≥ **P187E P18E8 Out Of Park to Park Transition Delay** ≥ **P187E P18E8 Out Of Park to Park Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park valve stuck off diagnostic enable (high side driver 1 or high side driver 2 is on) OR (pump out available (engine speed for engine speed low time) AND line press available (line pressure command)) P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) ((((mode valve A commanded low and mode valve A confirmed low)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE <250 RPM > 0.25 = FALSE < 100.00 kPa = FALSE = FALSE = FALSE	steady state fail time > 0.25 seconds OR transition fail time > 1.80 seconds OR transition fail time (at min line) > 1.80 seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR mode valve related fault disabled confirmation (P18AAOR P18AB OR P27EC Test Fail This Key On) OR mode valve sensor fault (P27EB OR P27ED OR P27EE Fault Active)) AND ((park inhibit solenoid electrically stuck on) OR (park inhibit solenoid electrically stuck on AND line pressure command))) OR min line commanded (line pressure command))	= TRUE = TRUE = TRUE = FALSE = TRUE ≥ **Park Inhibit Solenoid Override Line Pressure** < 100.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Command Message Performance	P189C	The diagnostic monitor detects a failure of the LIN serial communication failure between the TCM and the ECM/CHCM for Electronic Transmission Range Select (ETRS) vehicles.	LIN range command is undetected by TCM based on Rx LIN service fucntion Range Command Secondary Updated	= FALSE set to FALSE as part of normal background time updates, set to TRUE as part of normal LIN service fucntion when Rx messages are processed	diagnostic monitor calibration enable service mode $04 active run/crank voltage run/crank voltage time	= 1 Boolean = FALSE > 5.00 volts > 3,000.000 seconds	initial fail time > 3.000 seconds final fail time > 425.000 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Electronic Transmission Range Select Valve Performance - Stuck On (GR10 Only)	P18A1	This diagnostic monitor detects the condition where the transmission is latching the drive state on a commanded drive to park shift due to the range select valve being stuck on. P18A1 is only active during pressure / solenoid controlled shifts, not min line pressure default shifts which will break drive latch regardless of the range select valve position.	when: commanded mode valve high to low transition (drive to park shift) mode valve position park valve postion remains out of park transition delay for solenoid commanded mode valve transition increment fail time when fail time threshold met, increment fail count	= LOW = HIGH # Park ≥ **P18A1 P18AAP27EC Mode Valve High To Low Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable range select valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND (P27EB, P27ED, P27EE Fault Active) drive latch possible (mode valve previously confirmed position AND calculated line pressure)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = HIGH > 0.00	fail time > 0.10 seconds fail count > 3 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Inhibit Actuator Control Circuit Low (except T93 GR10)	P18A2	Controller specific circuit diagnoses internal ETRS park solenoid for an ground short or open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an short to ground circuit Increment fail time	> 200 K Ω impedance between signal and controller ground OR < 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (1=enabled, 0=disabled) ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on))	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = 1 = CeTSCR_e_HSD1 = On = CeTSCR_e_HSD1 = On	> 1.000 seconds 25 milliseconds 12.5 milliseconds fail time > 0.300 seconds out of sample time > 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Inhibit Actuator Control Circuit (T93 GR10 Only)	P18A3	Controller specific circuit diagnoses internal ETRS park solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Increment fail time	> 200 K Q impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (1=enabled, 0=disabled) ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on))	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = 1 = CeTSCR_e_HSD1 = On = CeTSCR_e_HSD1 = On	> 1.000 seconds 25 milliseconds 12.5 milliseconds fail time > 0.300 seconds out of sample time > 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Inhibit Actuator Control Circuit High	P18A4	Controller specific circuit diagnoses internal ETRS park solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Increment fail time	< 0.5 Q impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration (1=enabled, 0=disabled) ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on))	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = 1 = CeTSCR_e_HSD1 = On = CeTSCR_e_HSD1 = On	> 1.000 seconds 25 milliseconds 12.5 milliseconds fail time > 0.300 seconds out of sample time > 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Park Inhibit Solenoid Stuck Off (GR10 Only)	P18A8	This diagnostic monitor detects when the park inhibit solenoid is unable to maintain out of park/neutral as expected when out of park oil is not available	when: neutral commanded out of park oil park inhibit solenoid commanded (only required to start fail time) only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor not indicating out of park OR two valid park sensors (Park Sensor A AND Park Sensor B) not indicating out of park increment fail time when fail time threshold met, increment fail count	 = Neutral = Not Available = HIGH ≠ Out Of Park ≠ Out Of Park	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park inhibit solenoid stuck off diagnostic enable high side driver 1 or high side driver 2 is on OR (pump out available (engine speed for engine speed low time) AND line press available (line pressure command)) P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) (((mode valve A commanded low and mode valve A confirmed low) OR	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE <250 RPM > 0.25 = FALSE < 100.00 kPa = FALSE = FALSE = FALSE	fail time >0.13 seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					mode valve related fault (P18AA0R P18AB OR P27EC Test Fail This Key On) OR mode valve sensor fault (P27EB OR P27ED OR P27EE Fault Active))) park inhibit solenoid not electrically stuck off (P18A3 OR P18A4 Fault Active) (pump out available (engine speed for engine speed low time OR min line commanded (line pressure command)) aux pump commanded on	= TRUE = TRUE = TRUE = FALSE = FALSE < 250.00 > 0.25 < 100.00 kPa = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck On (GR10 Only)	P18AA	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "on" or "high" state while being commanded low or when pressure is insufficient to hold the mode valve high. After a failure of a pressure controlled mode valve high to low transition, a min line mode valve high to low transition is used for fault isolation between P18A1 and P18AA.	when: mode valve solenoid commaned state mode valve A position sensor state transition delay for solenoid controlled mode valve transition OR transition delay for solenoid min line mode valve transition (no transistion delay required for steady state commanded mode valve low conditions) increment fail time when fail time threshold met, increment fail count	= LOW = HIGH ≥ **P18A1 P18AAP27EC Mode Valve High To Low Transition Delay** ≥ **P18AA Mode Valve High To Low Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve stuck on diagnostic enable high side driver 1 or high side driver 2 is on (pump out available (engine speed for engine speed low time) AND line press available (line pressure command)) mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND ((pump out available (engine speed for engine speed high time) AND line pressure available (pressure commanded)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE <250 RPM > 0.25 = FALSE < 100.00 kPa = FALSE = FALSE = TRUE > 250.00 **Pump Out Available > Transition Time**	steady state fail time > 0.25 seconds OR high to low transition fail time > 0.10 seconds OR high to low min line transition fail time > 1.00 seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND out of park status) OR (pump out available OR line pressure available)	= TRUE > 100.00 kPa # Park = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck Off (GR10 Only)	P18AB	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "off" or "low" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “on” or “high” state. The diagnostic monitor also executes during transitions of the mode valve to verify Mode Valve A Position Sensor State changes correctly with mode valve state command.	when: mode valve solenoid commaned state mode valve A position sensor state transition delay for solenoid controlled mode valve transition (no transistion delay required for steady state commanded mode valve high conditions) increment fail time when fail time threshold met, increment fail count	= HIGH = LOW ≥ **P18AB P27EC Mode Valve Low to High Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve stuck off diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed for engine speed high time) AND line pressure available (pressure commanded) AND out of park status	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1.00 Boolean = TRUE = FALSE = FALSE = TRUE > 250.00 **Pump Out Available > Transition Time** = TRUE > 100.00 kPa = Park	steady state fail time > 0.75 seconds OR low to high transition fail time 0.25 >seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control Enable Valve Stuck On (GR10 Only)	P18AE	This diagnostic monitor detects when the Enable Valve is not able to cut pressure from the pump to the rest of the hydraulic system within the transmission. The test checks for C2 incorrectly gaining capacity when commanded on with line pressure cut.	park commanded commanded gear only one valid park valve sensor (either Park Sensor A OR Park Sensor B) with sensor indicating park OR two valid park sensors (Park Sensor A AND Park Sensor B) with both sensors indicating park enable valve delay time C2 pressure command C2 slip increment enable valve stuck on fail time	= PARK = PARK w/ No clutches = Park = Park > **P18AE Enable Valve Test Delay** = 2,200.00 < 60.00	ETRS system type is internal ETRS high side driver 1 or high side driver 2 is on trans oil temp engine crank (only required to initiate test) engine off commanded line pressure pump out available (engine speed for engine speed high time) transmission input speed enable valve diagnostic not completed (P18AE Test Pass / Test Fail This Key) no C2 solenoid electrical (P0964 OR P0966 OR P0967 Fault Active) no line pressure electrical fault (P2812 OR P2814 OR P2815 Fault Active) engine crank time total test time	= CeTRGR_e_InternalETRS = TRUE > 0.00 Deg C = TRUE = FALSE = 0 = TRUE > 250.00 RPM **Pump Out Available > Transition Time** > 300.00 RPM = FALSE = FALSE = FALSE < **P18AE Max Crank Time**	fail time > 4.50 update rate 6.25 milleseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						< 6.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch "A" Performance (GR10 Only)	P18E7	This diagnostic monitor detects park valve position sensor A performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded.	when: out of park commanded Park Sensor A indicating park Park Sensor B not indicating park transition delay for commanded park valve transition (not required for steady state commanded out of park conditions) increment fail time when fail time threshold met, increment fail count	± Park = Park * Park ≥ **P187D P18E7 Park to Out Of Park Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor A performance diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded high and mode valve A confirmed high mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = FALSE = FALSE	steady state fail time > 0.25 seconds transition fail time > 0.25 seconds fail count > 1.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park	= TRUE > 250 RPM **Pump Out Available > Transition Time** > 100.00 kPa > 1,000.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Position Sensor/ Switch "B" Performance (GR10 Only)	P18E8	This diagnostic monitor detects park valve position sensor B performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded.	when: steady state out of park commanded Park Sensor A not indicating park Park Sensor B indicating park increment fail time when fail time threshold met, increment fail count	# Park # Park = Park	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor B performance diagnostic enable high side driver 1 or high side driver 2 is on P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active) OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded high and mode valve A confirmed high mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed for	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = TRUE = FALSE = FALSE = TRUE	fail time > 0.25 seconds fail count > 2.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine speed time) line pressure available (commanded) line pressure sufficient for pull out of park	> 250 RPM **Pump Out Available > Transition Time** > 100.00 kPa > 1,000.00 kPa		
			when: park commanded Park Sensor A indicating park Park Sensor B not indicating park transition delay for commanded park valve transition OR transition delay for commanded park valve transition with min line (not required for steady state commanded park conditions) increment fail time when fail time threshold met, increment fail count	= Park = Park # Park ≥ **P187E P18E8 Out Of Park to Park Transition Delay** ≥ **P187E P18E8 Out Of Park to Park Min Line Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general park servo diagnostic enable park position sensor B performance diagnostic enable high side driver 1 or high side driver 2 is on OR (pump out available (engine speed for engine speed low time) AND line press available (line pressure command)) P187D, P187E (Park Servo DTC) Test Fail This Key On (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE <250 RPM > 0.25 = FALSE < 100.00 kPa = FALSE	steady state fail time > 0.25 seconds OR transition fail time > 1.80 seconds OR transition fail time (at min line) > 1.80 seconds fail count > 2.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR (P17FA, P17FB, P17FC (Park Sensor B) Fault Active) mode valve A commanded low and mode valve A confirmed low (park commanded) mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND mode valve sensor fault (P27EB, P27ED, P27EE Fault Active)	= FALSE = FALSE = TRUE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cabin Warm Up Request Signal Message Counter Incorrect (Emissions Neutral Diagnostic)	P18F2	This DTC monitors for an error in communication with the Cabin Warm Up Request Signals. Emissions neutral default action is to disable Cabin Warm Up shift-point and TCC modifications.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: Cabin Warm Up Request ARC	>= 8 counts out of >=10 counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	>= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Cabin Warm Up Request ARC samples every 1,000 milliseconds.	Emissions Neutral Diagnostic

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the TCM run/ crank is active.	Ignition switch Run/Start position circuit low	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	99 failures out of 240 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the TCM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	320 failures out of 400 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Actuator Supply Voltage B Circuit Low	P2670	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure, or where controller H/W cannot differentiate, diagnoses the high sided driver circuit for a short to ground failure or open circuit failure, when the output is powered on, by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground or an open circuit.	< 0.5 Q impedance between signal and controller ground OR > 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail count and increment sample count, otherwise increment only sample count	(ground short diagnostic monitor enable calibration OR open circuit diagnostic monitor enable calibration) high side drive 2 ON service mode $04 active	= 1 Boolean = 1 Boolean = TRUE = FALSE	ground short fail count > 6 counts within sample count of 2,400 counts OR open circuit fail count > 30 counts within sample count of 50 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Stuck Off (GR10)	P2714	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C4 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch oressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) **************************** enable C4 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C4 (GR10 C23467810R) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C4 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C4 clutch pressured map	= mapped to line pressure, C4 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Stuck On	P2715	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C4 clutch slip speed OR shift type is garage shift: C4 clutch slip speed ELSE shift is another type: C4 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to GR10 C4 C2346781OR clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR	> 10 kPa		
					Park/Neutral Stuck on FP OR	=TRUE		
					Neutral Staging Line Pressure Disable)	=TRUE		
					*****************************	******************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C4 off going clutch pressure control ramp time out complete AND	= TRUE		
					off going clutch pressure ramp control ramp time out enable)	= 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C4 off going clutch command pressure)	< 350 kPa	closed throttle upshift: **C4 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C4 exhaust delay open throttle power on up shift** garage shifts: **C4 exhaust delay garage shift** closed throttle downshift: **C4 exhaust delay closed throttle down shift** negative torque upshift: **C4 exhaust delay negative torque up shift** open throttle downshift: **C4 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE ± clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C5 Torque-Based Pressure Clip**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **ClOncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C4 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type) OR	± Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					(Intrusive shift active AND	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***************************** DTCs not fault pending	= 1 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions) ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					*****************************	*****************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Pressure Control (PC) Solenoid D Control Circuit High	P2721	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Stuck Off (GR10)	P2723	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C5 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch oressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** enable C5 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator Dedal position	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C5 (GR10 C1356789) clutch pressure control solenoid.			OR engine speed OR transmission input shaft speed)	 > 1,000.0 RPM > 350.0 RPM		
					C5 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C5 clutch pressured map	= mapped to line pressure, C5 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Stuck On	P2724	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C5 clutch slip speed OR shift type is garage shift: C5 clutch slip speed ELSE shift is another type: C5 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test					**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update	
					******************************	******************************		
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts	battery voltage time > 0.100 seconds	
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts	run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C5 C1356789 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					******************************	******************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C5 off going clutch command pressure)	< 350 kPa	closed throttle upshift: **C5 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C5 exhaust delay open throttle power on up shift** garage shifts: **C5 exhaust delay garage shift** closed throttle downshift: **C5 exhaust delay closed throttle down shift** negative torque upshift: **C5 exhaust delay negative torque up shift** open throttle downshift: **C5 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C5 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for aaraae shift	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 1 (0 will enable. 1 will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending	enable) = NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to Teststate or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					******************************	*******************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit Open	P2727	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch solenoid, or CVT TCC Control solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch, or CVT TCC Control solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R, or CVT TCC Control solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage	> 5.00 volts	> 25 milliseconds	
					OR			
					accessory voltage active	= TRUE	> 12.5 milliseconds	
					OR			
					Power Mode)	= ACCESSORY		
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Stuck Off (GR10)	P2732	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near oratzeroRPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C6 clutch slip speed, update fail time 6.25 milliscond update	> 200.0 RPM	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch pressure control solenoid is failed hydraulically off, the clutch does not maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional, which must take priority over any clutch pressure control solenoid stuck off diagnostic monitor. All clutch oressure control			procedure active hydraulic pressure available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** enable C6 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR accelerator pedal position OR	= FALSE Boolean = TRUE > 10.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 36.0 RPM > 0.50 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C6 GR10 C4567891OR clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,000.0 RPM > 350.0 RPM		
					C6 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C6 clutch pressured map	= mapped to line pressure, C6 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 0.500 seconds	
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Stuck On (GR10)	P2733	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C6 clutch slip speed OR shift type is garage shift: C6 clutch slip speed ELSE shift is another type: C6 clutch slip speed update fail time 6.25 milliscond update	 < 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is disabled. This diagnostic monitor is relative to the GR10 C6 C4567891OR clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> 10 kPa =TRUE =TRUE		
					****************************	*****************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 36.0 RPM		
					((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C6 off going clutch command pressure)	< 350 kPa	closed throttle upshift: **C6 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C6 exhaust delay open throttle power on up shift** garage shifts: **C6 exhaust delay garage shift** closed throttle downshift: **C6 exhaust delay garage shift** negative torque upshift: **C6 exhaust delay negative torque up shift** open throttle downshift: **C6 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: **C1 Torque-Based Pressure Clip** OR **C2 Torque-Based Pressure Clip** OR **C3 Torque-Based Pressure Clip** OR **C4 Torque-Based Pressure Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C5 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type)	± Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND shift type enable cal for garage shift AND	= FALSE = 1 (0 will enable, 1 will enable)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ****************************** DTCs not fault pending	= NEUTRAL OR commanded gear = 1 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 1 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions) ****************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not test fail this key on	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
					******************************	******************************		
					NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit Open	P2736	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1) clutch, 10 speed C45678910R clutch, 8 speed Line Pressure Control Circuit, or CVT binary pump, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891OR clutch, 8 speed line pressure control, or CVT binary pump, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.10 seconds out of sample time > 0.17 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1), 10 speed C4567891OR clutch, 8 speed line pressure control, or CVT binary pump, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Auxiliary Transmission Fluid Pump Control Circuit Open	P2796	Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for an open circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit update fail and sample count	> 200 K Q impedance between signal and controller ground	diagnostic report enable diagnostic monitor enable run crank voltage battery voltage battery voltage (pump is fed by high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (pump is fed by high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (pump is fed by high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) OR pump is not fed by any HSD	= 1 Boolean = 1 Boolean > 5.00 volts > 9.00 volts < 15.0 volts = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will enable)	> 20 fail counts out of > 25 sample counts update rate 100 milliseconds > 25 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Auxiliary Transmission Fluid Pump Performance	P2797	Detects when the transmission auxiliary pump system, used to provide transmission hydraulic pressure, is not capable of supplying adequate hydraulic pressure during an engine auto-start. The transmission holding clutch pressures are commanded to meet the engine crank shaft torque output, to prevent clutch slip to those holding clutches, during the engine auto-start. The diagnostic monitors transmission input shaft speed during the auto-start event as the primary malfunction criteria. Measured input shaft speed that is excessive is an indication the holding clutches are slipping due to inadequate hydraulic pressure, as a result of a failed surge accumulator or transmission auxiliary pump system.	Transmission turbine speed is greater than predicted turbine speed during autostart event, update initial fail count	**P2797 predicted > turbine speed error** Refer to "Transmission Supporting Tables" for details			> 8 counts (initial fail count) Frequency =12.5ms Once the above counts are achieved then increment the final fail counter once. The final fail counter can only increment once per autostart event > 3 counts (final fail counter) If above counter is greater than threshold then report DTC failed. Frequency = 12.5ms	Type B, 2 Trips
					diagnosis enable cal	= 1 (1 to enable, 0 to disable)		
					PRNDL state defaulted	= False		
					Transmission shift lever position	= Forward range A		
					Propulsion system active	= True	propulsion system active for > 5.00 sec	
					Ignition voltage	> 9.00 volts		
					Ignition voltage	< 31.99 volts		
					Transmission fluid temp	> 0.00 °C		
					Transmission fluid temp	< 110.00 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					engine state AutoStop duration min	= Engine off > 1.200 seconds		
					During autostop Engine speed was	< 5.0 RPM		
					**************************** If above conditions are met then the following must occur:			
					Turbine speed	> 80.0 RPM		
					Engine speed	> 450.0 RPM		
					Hydraulic pressure delay time	**> P2797 hydraulic pressure delay** Refer to "Transmission Supporting Tables" for details		
					If above conditions are met then increment time-out timer. Time-out timer	< 0.38 seconds		
					Note: The initial fail counter must achieve the fail threshold in less than the time-out time.			
					***************************** If vehicle is launched then:			
					Transmission gear ratio	= 4.696 1st gear ratio = 2.985 2nd gear ratio = 2.156 3rd gear ratio = 1.779 4th gear ratio = 1.526 5th gear ratio = 1.278 6th dear ratio		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Trans 1st gear ratio	< 1.120 % of 1st gear ratio		
					Trans 1st gear ratio	> 0.880 % of 1st gear ratio		
					Trans gear ratio not 1st gear	< 1.070 % of gear ratio		
					Trans gear ratio not 1st gear	> 0.930 % of gear ratio		
					Valid transmission gear ratio achieved time	> 0.500 seconds		
					OR			
					If vehicle is not launched but autostart occurs then:			
					Turbine speed	< 5.00 RPM		
					Turbine speed less then above threshold for	> 0.500 seconds		
					Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in the C1234 clutch. After the clutch slip event, the main transmission pump and clutch will gain capacity, clutch slip will go to zero. If the vehicle is launching (moving) then a valid transmission ratio can be achieved. Or if the brake is continually applied and an autostart occurs naturally, then no ratio can be measured. In this case turbine speed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					will return to near zero rpm. **************************** DTCs not fault active DTCs not Test Failed This Key On	CrankSensor_FA Transmission Output Shaft Angular Velocity Validity Transmission Turbine Angular Velocity Validity Transmission Oil Temperature FA P171A, P171B, P171C, U0101, P182E, P1915 P2796, P2798, P2799		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Auxiliary Transmission Fluid Pump Control Circuit Low	P2798	Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for a ground short circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short update fail and sample count	< 0.5 Q impedance between signal and controller ground	diagnostic report enable diagnostic monitor enable run crank voltage battery voltage battery voltage (pump is fed by high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (pump is fed by high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (pump is fed by high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) OR pump is not fed by any HSD	= 1 Boolean = 1 Boolean > 5.00 volts > 9.00 volts < 15.0 volts = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will enable)	> 20 fail counts out of > 25 sample counts update rate 100 milliseconds > 25 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Auxiliary Transmission Fluid Pump Control Circuit High	P2799	Controller specific auxiliary transmission fluid pump motor control circuit diagnoses the pump motor and wiring for a short to power circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a voltage short Controller specific circuit voltage thresholds are set to meet the following controller specification for a voltage short Increment fail and sample count	< 0.5 Q impedance between signal and controller voltage source	diagnostic report enable diagnostic monitor enable run crank voltage battery voltage battery voltage (pump is fed by high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (pump is fed by high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (pump is fed by high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3) OR pump is not fed by any HSD	= 1 Boolean = 1 Boolean > 5.00 volts > 9.00 volts < 15.0 volts = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will enable)	> 20 fail counts out of > 25 sample counts update rate 100 milliseconds > 25 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10 C1 C123456R clutch or CVT secondary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC orGRIO C2 C128910R clutch or CVT primary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid B electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10 C3 C23457910 clutch or CVT line) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5C1356789 clutch pressure or CVT C1 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid D electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid E Calibration Incorrect	P27AB	The diagnostic monitor verifies that the pressure control solenoid E (GF9 C3 CB38 clutch or GR10 C4 C2346781OR clutch or CVT TCC) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid E electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Calibration Incorrect	P27AC	The diagnostic monitor verifies that the pressure control solenoid F (GF9 C4 C4 clutch or GR10 C6 C45678910R clutch or CVT binary pump) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Calibration Incorrect	P27AD	The diagnostic monitor verifies that the pressure control solenoid G (GF9 C5 C57R clutch or GR10 line or CVT mode valve A ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid H Calibration Incorrect	P27AE	The diagnostic monitor verifies that the pressure control solenoid H (GF9 C6 C6789 clutch or GR10 TCC or CVT mode valve B ETRS only) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault - the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch - the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault - pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit/Open	P27EB	The diagnostic monitor detects an illegal voltage on the mode valve A position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.260 volts < 1.500 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck On (GR10 Only)	P27EC	Sensor signal fails to transition when solenoid mode valve control commands to PARK, DRIVE or REVERSE occur.	when: mode valve solenoid commaned state mode valve A position sensor state confirmed park servo position transition delay for solenoid controlled mode valve transition (not required for steady state mode valve low conditions) increment fail time when fail time threshold met, increment fail count	 = LOW = HIGH = PARK ≥ **P18A1 P18AAP27EC Mode Valve High To Low Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve sensor performance enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND move valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND park servo fault (P187D, P187ETest Fail This Key On) one good park sensor (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active OR P17FA, P17FB, P17FC (Park Sensor B) Fault Active) pump out available (engine speed for engine speed high time) AND line pressure available	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = TRUE > 250.00 **Pump Out Available > Transition Time**	steady state fail time > 0.02 seconds OR transition fail time > 0.10 seconds fail count > 4.00 counts update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(pressure commanded)	= TRUE > 100.00 kPa		
			when: mode valve solenoid commaned state mode valve A position sensor state confirmed park servo position transition delay for solenoid controlled mode valve transition (not required for steady state mode valve high conditions) increment fail time when fail time threshold met, increment fail count	 = HIGH = LOW = OUT OF PARK ≥ **P18AB P27EC Mode Valve Low to High Transition Delay**	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable mode valve sensor performance enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND move valve sensor fault (P27EB, P27ED, P27EE Fault Active) AND park servo fault (P187D, P187ETest Fail This Key On) one good park sensor (P17F5, P17F6, P17F7 (Park Sensor A) Fault Active OR P17FA, P17FB, P17FC (Park Sensor B) Fault Active) pump out available	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE	steady state fail time > 0.75 seconds transition fail time > 0.25 seconds fail count > 4.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine speed for engine speed high time) AND line pressure available (pressure commanded)	= TRUE > 250.00 **Pump Out Available** **> Transition Time** = TRUE > 100.00 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit Low	P27ED	The diagnostic monitor detects a ground short or open circuit fault on the mode valve A position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control A Position Sensor/ Switch Circuit High	P27EE	The diagnostic monitor detects a short to voltage on the mode valve A position sensor circuit.	raw sensor voltage	> 2.530 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS	= 1 Boolean > 9.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit Open	P2812	Controller specific circuit diagnoses 9 speed Line Pressure Control Circuit, 10 speed Line Pressure Control Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Ω impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.60 seconds out of sample time > 0.65 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage	> 5.00 volts	> 25 milliseconds	
					OR accessory voltage active	= TRUE	> 12.5 milliseconds	
					OR Power Mode)	= ACCESSORY		
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Performance /Stuck Off - GR10 Specific	P2817	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically off. The monitor executes when the transmission torque converter is commanded to a "lock" mode during which the torque converter will be controlled to near zero (0.0) RPM slip speed, or, an "on" mode during which the torque converter will be controlled to target slip speed using slip speed error. The transmission torque converter control valve solenoid is considered failed hydraulically off when the "lock" mode slip speed is excessive, or, when the 'on" mode slip speed error is excessive.	if use TCC slip speed error OR TCC control mode TCC slip speed error = TCC slip speed - TCC command slip speed else if TCC control mode torque convert slip = engine speed - transmission input shaft speed then update fail time 25 millisecond update rate	= 0 Boolean = ON mode (controlled slip mode) ≥ **P2817TCC stuck off fail TCC slip speed** = LOCK > 130.0 RPM	diagnostic monitor enable TCC command capacity TCC command pressure (TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode current) (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean > 0.00 % > 500.0 kPa ≠ TCC control mode current # ON mode (controlled slip mode) # LOCK = ON mode (controlled slip mode) = LOCK = 1 Boolean = 1 Boolean > 500.0 RPM	fail time > 4.000 seconds increment fail count fail count > 3 counts 25 millisecond update rate TCC command capacity time > 0.00 seconds TCC command pressure time > 2.00 seconds engine speed time > **engine speed time for transmission hydraulic pressure available**	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active battery voltage run crank voltage (PTO active OR PTO disable calibration) accelerator pedal position accelerator pedal position range shift state transmission fluid temperature transmission fluid temperature engine torque engine torque P2817 test fail this key on (TCC control mode OR TCC control mode) attained gear attainded gear slip DTCs not fault active DTCs not fault oendina	= FALSE > 9.00 volts > 9.00 volts = FALSE = 1 Boolean > 8.0 % < 99.0 % = range shift complete > -6.66 °C < 130.0 °C > 50.0 Nm < 8,191.8 Nm = FALSE = ON mode (controlled slip mode) = LOCK ≥ CeCGSR_e_CR_Second > 75.00 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D P0722, P0723, P0716, P0717, P07BF, P07C0	see supporting table battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Stuck On - GR10 specific	P2818	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. This is evaluated by monitoring slip across the torque converter in two cases: 1) during low speed shifts into drive and reverse while monitoring engine speed and 2) outside of garage shifts by monitoring engine speed decel and torque for potential engine stall	ABS(TCC slip speed) (set point engine speed - actual engine speed) (maximum engine speed during garage shift - current engine speed) engine torque update TCC stuck on fail time garage shift	< 40.0 RPM > 50.0 RPM > 50.0 RPM > 85.0 Nm	MIN(commanded or attained gear turbine speed) active clutch control freewheel-to-lock shift lock-to-freewheel shift (commanded gear AND output speed) OR (commanded gear AND output speed) primary oncoming clutch command primary oncoming control state (TCC stuck off enable OR TCC stuck on enable)	< desired engine speed - 50.0 RPM = garage shift = FALSE = FALSE = REVERSE < 50.0 RPM > FIRST GEAR > -50.0 RPM > Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset** # clutch fill = 1 Boolean = 1 Boolean	TCC stuck on fail time garage shift **P2818TCC stuck on fail time garage** > **shift -GR10** update fail count when: fail count > 3 counts set DTC fault active 25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					battery voltage	> 9.00 volts		
					run crank voltage	> 9.00 volts		
					diagnostic monitor enable	= 1 Boolean	battery voltage time > 0.100 seconds	
					PRNDL commanded gear PRNDL commanded gear	# PARK # PARK # NEUTRAL # NEUTRAL	run crank voltage time > 0.100 seconds	
					TCC command mode (PTO active OR PTO disable calibration)	= OFF = FALSE = 1 (0 to enable, 1 to disable)		
					transmission fluid temperature transmission fluid temperature	> -6.66 °C < 130.00 °C		
					engine torque engine torque	> -25.0 Nm < 800.0 Nm		
					turbine speed	> cmnd gear turbine speed - 25.0 RPM		
					P2818 test fail this key on	= FALSE		
					engine speed engine speed accelerator pedal position 4WD low state (driver shift mode active OR driver shift mode calibration)	> 300.0 RPM < 1,000.0 RPM < 5.0 % = FALSE = FALSE = 0 (0 to enable, 1 to disable)		
					(misfire requests TCC off OR	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					misfire TCC off calibration) clucth control solenoid stuck ON AND stuck OFF intrusive shift active TCC solenoid pulse request vehicle speed (not garage shift) minimum turbine speed DTCs not fault pending DTCs not fault active	= 0 (0 to enable, 1 to disable)Boolean = FALSE = FALSE < 4.0 KPH < set point engine speed - 50.0 RPM P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821 AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		
			active clutch control ABS(TCC slip speed) engine torque [(set point engine speed - actual engine speed) OR	± garage shift < 30.0 RPM > 90.0 Nm > 150.0 RPM			TCC stuck on stall pending time > **P2818TCC stuck on fail time stall pending - GR10** when: fail count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			rate of change of engine speed] update TCC stuck on stall pending time	< -2,000 RPM/second			> 4 counts set DTC fault active 25 millisecond update rate	
					MIN(commanded or attained gear turbine speed) active clutch control freewheel-to-lock shift lock-to-freewheel shift (commanded gear AND output speed) OR (commanded gear AND output speed) primary oncoming clutch command (TCC stuck off enable OR TCC stuck on enable) battery voltage run crank voltage diagnostic monitor enable PRNDL	< desired engine speed - 50.0 RPM ± garage shift = FALSE = FALSE = REVERSE < -999,999.0 RPM > FIRST GEAR > 0.0 RPM > Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset** = 1 Boolean = 1 Boolean > 9.00 volts > 9.00 volts = 1 Boolean # PARK	battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					commanded gear	# PARK		
					PRNDL	# NEUTRAL		
					commanded gear	# NEUTRAL		
					TCC command mode	= OFF		
					(PTO active OR PTO disable calibration)	= FALSE = 1 (0 to enable, 1 to disable)		
					transmission fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.00 °C		
					engine torque	> -25.0 Nm		
					engine torque	< 800.0 Nm		
					turbine speed	> cmnd gear turbine speed - 25.0 RPM		
					P2818 test fail this key on	= FALSE		
					engine speed	> 300.0 RPM		
					engine speed	< 1,000.0 RPM		
					accelerator pedal position	< 5.0 %		
					4WD low state	= FALSE		
					(driver shift mode active OR driver shift mode calibration)	= FALSE = 0 (0 to enable, 1 to disable)		
					(misfire requests TCC off OR misfire TCC off	= FALSE = 0 (0 to enable, 1 to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					calibration) clucth control solenoid stuck ON AND stuck OFF intrusive shift active TCC solenoid pulse request vehicle speed minimum turbine speed DTCs not fault pending DTCs not fault active	disable)Boolean = FALSE = FALSE < 15.0 KPH < set point engine speed - 50.0 RPM P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821 AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0, P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit, 10 speed TCC Control Circuit, 8 speed T93 Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For 8 speed T87a controllers, an open circuit on the Default Valve Control Circuit will also set P281D.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts > 5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid J Stuck Off (GR10)	P2820	Each pressure control solenoid stuck off diagnostic monitor detects a control solenoid failed hydraulically off, while the solenoid is electrically functional. This diagnostic monitor detects the default disable valve solenoid failed hydraulically off. The default disable valve is used to route hydraulic fluid to transmission clutches to achieve a hydraulic default gear in the event that a fault occurs which requires the solenoid electrical drivers to be turned off. If the default disable solenoid is hydraulically stuck off, the transmission will enter hydraulic default unintentionally while the control system is actively commanding another gear, which can result in a tie-up condition. When the default disable valve solenoid is hydraulically off while in drive, hydraulic fluid will be routed to clutches to achieve either 7th or 2nd gear. If the vehicle is moving	(gear ratio AND gear ratio) OR (gear ratio AND gear ratio) (C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed OR C3 clutch slip speed C4 clutch slip speed C5 clutch slip speed C6 clutch slip speed) update fail time 6.25 milliscond update	> 1.020 < 0.980 > 0.980 < 1.020 < 50.00 < 50.00 < 50.00 < 50.00 < 50.00 < 50.00 < 50.00 < 50.00	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean	if engine torque <20.0 Nm fail time < 0.50 sec else fail time = 0.25 seconds 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and the control system is commanding a different gear, the solenoid fault can be detected as either a clutch tie-up or startle mitigation event. Shifting to neutral while monitoring gear ratio will isolate the fault as either a stuck on clutch solenoid or a stuck off default disable valve solenoid. For GR10 non-ETRS applications, the stuck off solenoid can be detected by monitoring transmission input speed deceleration magnitude and timing during a stationary shift into drive from park, neutral, or reverse. If the driver attempts unsucessfully to accelerate and then again shifts into drive, this 2nd shift triggers a neutral test which monitors input speed to confirm that the default disable solenoid is stuck off			service fast learn active service solenoid cleaning procedure active hydraulic pressure available hydraulic line pressure ***************************** conditions to trigger start of test: (clutch control solenoid test state OR clutch control solenoid test state) Offgoing clutch stuck on test result (for any clutch) Default disable stuck off enable cal for tie-up events current predicted hydraulic default gear if solenoid drivers are turned off ***************************** conditions needed through duration of test: attained gear transmission output speed driver direction reauest	= FALSE Boolean = FALSE Boolean = TRUE > 10.00 kPa ***************************** = Tie Up Test Active = Tie Up Test Hold = Test Failing = 1 (1 to enable, 0 to disable) = a drive gear (i.e. 2nd or 7th gear) ***************************** = NEUTRAL > 36.00 RPM = FORWARD		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					******************************	******************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
			(gear ratio AND gear ratio) OR (gear ratio AND	> 1.020 < 0.980 > 0.980			if engine torque <20.0 Nm fail time <0.50 sec else	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			gear ratio) (C1 clutch slip speed C2 clutch slip speed C3 clutch slip speed C4 clutch slip speed OR C3 clutch slip speed C4 clutch slip speed C5 clutch slip speed C6 clutch slip speed) update fail time 6.25 milliscond update	< 1.020 < 40.00 < 40.00 < 40.00 < 40.00 < 40.00 < 40.00 < 40.00 < 40.00	****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active	****************************** = 1 Boolean = 1 Boolean > 9.00 volts = 1 Boolean = 1 Boolean > 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time = 0.25 seconds 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					hydraulic pressure available	= TRUE		
					(hydraulic line pressure OR Clutch Stuck on in Park/ Neutral Fault Pending OR Neutral Staging Line Pressure Disable)	> 10.00 kPa = TRUE =TRUE		
					*****************************	*****************************		
					conditions to trigger start of test:			
					clutch control solenoid test state	= Neutral Test State		
					Default disable stuck off enable cal for startle events	= 0 (1 to enable, 0 to disable)		
					Startle Mitigation Active	= TRUE		
					*****************************	*****************************		
					conditions needed through duration of test:			
					current predicted hydraulic default gear if solenoid drivers are turned off	= a drive gear (i.e. 2nd or 7th gear)		
					attained gear	= NEUTRAL		
					driver direction request	= FORWARD		
					*****************************	*****************************		
					DTCs not fault pending	P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6		
					DTCs not test fail this key on	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA		
					DTCs not fault active	P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732 P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		
			Input speed decel test: transmission input speed deceleration	> **P2820 GR10 hydraulic default input speed deceleration threshold**			decel time: > 0.05 sec decel observed within **P2820 GR10 hydraulic default at launch test window**	
			neutral test to set DTC on next shift into drive:					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			transmission input speed	<100 RPM			neutral test fail time > 0.10	
					*****************************	*****************************	6.25 millliscond update	
					system-level enables:			
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage)	> 9.00 volts		
					use run crank voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 1 Boolean		
					AND			
					run crank voltage)	> 9.00 volts		
					TOM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TOM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hvdraulic pressure	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					available			
					(hydraulic pressure	> 10.00 kPa		
					OR Clutch Stuck on in Park/ Neutral fault pending	= TRUE		
					OR Neutral Staging Line Pressure Disable)	= TRUE		
					******************************	******************************		
					conditions needed to trigger decel test:			
					Driver direction change request	= TRUE		
					Driver requested direction	= FORWARD		
					default disable stuck off at launch enable cal	= 0 (1 to enable, 0 to disable)		
					ETRS system type	= CeTRGR_e_InternalETRS		
					deceleration test on previous shift into drive failed	(CeTRGR_e_NoETRS to enable)		
					P2820 Test Passed this Key on	= TRUE		
					OR (Multiple pass cal	= FALSE		
					AND Trans output speed since last pass)	= 0 (1 to enable, 0 to disable)		
					Accelerator pedal position	> 36.0 RPM	>0.10 sec	
					transmission input speed	< 2.5 %		
					transmission output speed	< 900 RPM		
					******************************	< 100 RPM		
					conditions needed throuah duration of decel	******************************		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					test: commanded gear Driver direction request current predicted hydraulic default gear if solenoid drivers are turned off transmission input speed transmission output speed ***************************** conditions needed to trigger neutral test: decel test failed transmission output speed attained gear direction brake pedal position park brake status park brake status accelerator pedal position Driver direction change request driver requested direction transmission input speed ***************************** DTCs not fault pending DTCs not test fail this key	= NEUTRAL = FORWARD = a drive gear (i.e. 2nd) < 900 RPM < 100 RPM ***************************** = TRUE < 100 RPM = FORWARD < 5.00 % # APPLIED # APPLY IN PROGRESS > 10.0 % = TRUE = FORWARD > 100 RPM ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6	All conditions met for > 1.00 sec, increment count, count > 1 , set FP	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on DTCs not fault active	P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C P126C P176D P17CC P17CD P0962 P0966 P0970 P2720 P2729 P2738 P0963 P0967 P0971 P2721 P2730 P2739 P0960 P0964 P0968 P2718 P2727 P2736 P17CE P1783 P17D3 P17C5 P0721 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0723 P0722 P176B P17D6 P0747 P0777 P0797 P2715 P2724 P2733 P0746 P0776 P0796 P2714 P2723 P2732, P2818, P2821 P2820 P178F P17C6 P17C4 P17C7 P172AP172B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Stuck On (Default Disable Solenoid Stuck On) (GR10 Only)	P2821	The diagnostic monitor tests for the default disable solenoid stuck on at engine start (pump out pressure transition)	when: mode valve solenoid commaned state mode valve position in park engine crank active (required to initiate test) increment fail time when fail time threshold met, increment fail count	 = LOW = HIGH = TRUE	ETRS system type is internal ETRS time since controller init battery voltage general mode valve diagnostic enable default disable solenoid stuck on diagnostic enable high side driver 1 or high side driver 2 is on mode valve related fault (P18AA, P18AB, P27EC Test Fail This Key) AND (P27EB, P27ED, P27EE Fault Active) pump out available (engine speed for engine speed high time)	= CeTRGR_e_InternalETRS > 0.01 seconds > 9.00 volts = 1 Boolean = 1 Boolean = TRUE = FALSE = FALSE = TRUE > 250.00 **Pump Out Available** **> Transition Time**	fail time > 0.25 seconds fail count > 2.00 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit Open (T93 Controller only)	P2824	Controller specific circuit diagnoses 10 speed Default Disable Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit Low	P2826	Controller specific circuit diagnoses 9 speed Clutch Select Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds. For T87a controllers, an open circuit on solenoid I/J will also set P2826	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Ω impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	> 5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 1	P30D6	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>= 8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the TCM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>= 8.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 1 6 counts intermittent 12.5 ms /count in the TCM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
P3186 (Internal Control Module Security Peripheral Performance)	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	2.00	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds before the sample time of is reached	3.00 counts (equivalent to 800.01 milliseconds) 800.01 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode:	> 15,000.00 milliseconds >11.00 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Never Disabled If OBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >= 9.00 Volts > 15,000.00 milliseconds >11.00 Volts >= 8.00 Volts Disable >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With ECM/PCMA	U0100	This DTC monitors for a loss of communication with ECM/PCMA	Message is not received from controller for Message $011 Message $016 Message $01C Message $01D Message $02A Message $084 Message $086 Message $087 Message $08C Message $097 Message $213 Message $214 Message $21D	 >=10,000.00 milliseconds >=500.00 milliseconds >=500.00 milliseconds >=500.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=500.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 6.25 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $227 Message $229 Message $22A Message $254 Message $41D Message $41F Message $429 Message $499 Message $4BB Message $4BC Message $4BD Message $4C1	milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: Never Disabled If OBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >= 9.00 Volts > 15,000.00 milliseconds >11.00 Volts >= 8.00 Volts Disable >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module	Message is not received from controller for Message $012 Message $014 Message $015 Message $017 Message $01A Message $081 Message $082 Message $210 Message $211 Message $219 Message $415 Message $42A Message $4B2	>=10,000.00 milliseconds >=500.00 milliseconds >=500.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=500.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $4B4 Message $4B5	milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: Never Disabled If OBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >= 9.00 Volts > 15,000.00 milliseconds >11.00 Volts >= 8.00 Volts Disable >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Power Steering Control Module	U0131	This DTC monitors for a loss of communication with Power Steering Control Module	Message is not received from controller for Message $023	>=10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 6.25 ms loop	Emissions Neutral Diagnostic - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: Never Disabled If OBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >= 9.00 Volts > 15,000.00 milliseconds >11.00 Volts >= 8.00 Volts Disable >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with Body Control Module	Message is not received from controller for Message $010 Message $205 Message $284 Message $404 Message $409 Message $40C Message $413 Message $460 Message $461	 >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds >=10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: Never Disabled If OBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >= 9.00 Volts > 15,000.00 milliseconds >11.00 Volts >= 8.00 Volts Disable >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A	U0146	This DTC monitors for a loss of communication with Gateway A	Message is not received from controller for Message $20D	>=10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 6.25 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: Never Disabled If OBDII: Run/Crank ignition voltage If EOBD: Run/Crank ignition voltage If Secure: Starter motor engaged for Or Run/Crank ignition voltage If Hybrid Secure: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts >= 9.00 Volts > 15,000.00 milliseconds >11.00 Volts >= 8.00 Volts Disable >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Restraints Control Module	U0151	This DTC monitors for a loss of communication with the Restraints Control Module	Message is not received from controller for Message $0D1 Messsage $0D2 Message $43C	 >= 10,000 milliseconds >= 10,000 milliseconds >= 10,000 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 6.25 ms loop	Emissions Neutral Diagnostic - Type C

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
					If calibratable low voltage disable mode is not Never Disabled			
					Low voltage disable mode: Never Disabled			
					If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	>11.00 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>= 8.00 Volts		
					If power mode = Accessory:	Disable		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From ECM/ PCM	U0401	This DTC monitors for an error in communication with ECM/PCM	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC), of the following signals received over serial data is incorrect for: RxArcSig_AATP_ARC MACSig_ActAxlTrq_Prtctd RxArcSig_ESP_ARC MACSig_EngSpd_Prtctd RxArcSig_PBP_ARC MACSig_ECMGnrlInfo2_ Prtctd RxArcSigJD IATMNP_AR C MACSig_DrvrIntdAxlTqM n_Prtctd RxArcSig_DITP_ARC MACSig_DrvrIntndTrq_Prt ctd RxArcSig_PSP_ARC	10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 3.00 fail counts out of	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: CeINFR_e_TCM	>= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			MACSig_PrplStat_Prtctd RxArcSig_VSADP_ARC MACSig_VehSpdAvgDrvn_Prtctd RxArcSig_OATP_ARC MACSig_OtsAirTmp_Prtctd RxArcSig_WDP_ARC MACSig_WhlDist_Prtctd RxArcSig_CHCG_ARC	10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Brake System Control Module	U0418	This DTC monitors for an error in communication with Brake System Control Module	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC), of the following signals received over serial data is incorrect for: RxArcSig_CSBTP_ARC: MACSig_ChsSysBrkTrq_Prtctd: RxArcSig_RATVCP_ARC: MACSig_RrAxTrqValCmd_Prtctd: RxArcSig_BSIRP_ARC: MACSig_EBCMGnrlInfo1_Prtctd: RxArcSig_EPBSP_ARC: MACSig_ElecPrkBrkSts_Prtctd	10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 10.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 10.00 sample counts 2.00 fail counts out of 18.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: CeINFR_e_TCM	>= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Power Steering Control Module	U0420	This DTC monitors for an error in communication with the Power Steering Control Module.	The signal value of the Alive Rolling Count (ARC) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus.		Executes in 12.5ms loop.	Emissions Neutral Diagnostics - Type C
			RxArcSig_SWIP_ARC:	10.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
			MACSig_StrgWhlInfo_Prtctd:	10.00 fail counts out of 18.00 sample counts	Battery voltage	>= 11.00 volts		
					Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: CeINFR_e_TCM			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Body Control Module	U0422	This DTC monitors for an error in communication with the Body Control Module	The signal value of the Alive Rolling Count (ARC),Message Authentication Code (MAC), of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			RxArcSig_PltfTrnsTUDSwStARC	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			RxArcSig_SPMP_ARC	3.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			MACSig_SysPwrMode_Prtctd	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: CeINFR_e_TCM			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Gateway A	U0447	This DTC monitors for an error in communication with Gateway A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect times for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for:	>= 5,000.00 milliseconds	Executes in 12.5ms loop.	Type A, 1 Trips
			RxArcSig_BSPMP_ARC	3.00 fail counts out of 10.00 sample counts	Battery voltage	>= 11.00 volts		
			MACSig_BkupSysPwrMode_Prtctd	3.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
					If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: CeINFR_e_TCM			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Restraints Control Module	U0452	This DTC monitors for an error in communication with Restraints Control Module	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect times for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Emissions Neutral Diagnostics - Type C
					All the following conditions are met for:	>= 5,000.00 milliseconds		
			RxArcSig_IMUSR2_ARC	4.00 fail counts out of 10.00 sample counts	Battery voltage	>= 11.00 volts		
			CSUM_IMUSR2_CS	4.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
			RxArcSigJMUSRI P_ARC	4.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			MACSig_IMUSnsrRw1_Prtctd	4.00 fail counts out of 10.00 sample counts	Controller type: CeINFR_e_TCM			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Input Power Circuit A - Ignition Input On/Start Circuit Correlation	U3023	Detect a Power A vs RuncCrank correlation error	Power A - RunCrank - Voltage	> 3.00	PowerA- RunCrank Correlation monitoring enable = TRUE Battey Present RunCrank Active Starter Motor NOT Engaged	Diagnostc is 1.00 Battey Present = TRUE RunCrank Active = TRUE Starter Motor Engaged = FALSE	40.00 failures out of 50.00	Type A, 1 Trips

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description:

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSReCREighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1 OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606 PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1 OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	3	3	3

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606 PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1 OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

.

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2797 hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds
X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P2797 predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1 OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606 PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1 OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	3	3	3

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606 PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1 OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

Initial Supporting table - P0606_Last Seed Timeout f(Loop Time)

Description: The max time for the Last Seed Timeout as a function of operating loop time sequence.

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	500.000	500.000	1,000.000	2,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	3	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	3	3	3	3	3	3	3	3

Initial Supporting table - P0606_PSW Sequence Sample f(Loop Time)

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_1OmsSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_1OOmsSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

Initial Supporting table - C1 exhaust delay closed throttle down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift

.

Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay garage shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C1 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.500	1.000	0.750	0.750	0.750

Initial Supporting table - C1 Torque-Based Pressure Clip

Description: Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

Value Units: Clutch Pressure (kPa)
X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	690	690	690	690	690

Initial Supporting table - C1_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C2 exhaust delay closed throttle down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay garage shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C2 exhaust delay negative torque up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C2 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C2 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	400	500	500	500

Initial Supporting table - C2_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C3 exhaust delay closed throttle down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay garage shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C3 exhaust delay negative torque up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay open throttle power on up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.000	0.750	0.750	0.750	0.750

Initial Supporting table - C3 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C3 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	400	500	575	800

Initial Supporting table - C3_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C4 exhaust delay closed throttle down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C4 exhaust delay negative torque up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C4 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C4 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	400	650	750	800	900

Initial Supporting table - C4_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay closed throttle down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay garage shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay negative torque up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C5 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C5 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	300	600	700	750	900

Initial Supporting table - C5_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C6 exhaust delay closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C6 exhaust delay negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C6 exhaust delay open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 exhaust delay open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - C6 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C6 Oncoming Clutch Torque (Nm)

y/x	0	100	200	300	600
1	350	650	750	800	950

Initial Supporting table - C6_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Clip Press CD Shifts

.

Description: Oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	400	400	400	400	400	400

Initial Supporting table - Clutch Clip Press GS Shifts

Description: Oncoming clutch clip pressure for garage shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts

Description: Oncoming clutch clip pressure for negative torque up shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	450	450	600	450	450

Initial Supporting table - Clutch Clip Press PD Shifts

Description: Oncoming clutch clip pressure for open throttle power down shifts

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	500	600	750	750	500

Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts

Description: Used for closed throttle down shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts

Description: Used for garage shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts

Description: Used for open throttle power down shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts

Description: Used for powered up shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	1	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts

Description: Used for clutch staging shifts to add additional fail time based on oil temperature

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Shift Type Enable

Description: Calibration to enable the clutch stuck on test for each shift type

X Unit: Shift Type
Y Units: Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	1	1	1	1	1	0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P0741 GR10 torque converter K factor fail limit

Description:

Value Units: transmission torque converter K factor
X Unit: transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

y/x	0.000	0.100	0.200	0.300	0.500	0.700	0.800	0.945	0.950
1	400.0	300.0	225.0	200.0	200.0	200.0	250.0	1,000.0	16,383.8

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P187D P18E7 Park to Out Of Park Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.00	2.00	1.00	0.80	0.80

Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.80	2.40	1.20	1.20	1.20

Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2.40	1.20	0.60	0.60	0.60

Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.60	0.80	0.25	0.07	0.07

Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.70	2.00	0.80	0.43	0.26

Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.20	0.60	0.20	0.10	0.08

Initial Supporting table - P18AE Enable Valve Test Delay

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.50	0.30	0.16	0.08	0.08

Initial Supporting table - P2797 hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds
X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P2797 predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.200	0.100

Initial Supporting table - P2820 GR10 hydraulic default at launch test window

Description:

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	0	0	1	1	1

Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

Description:

Value Units: kPa
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00

Initial Supporting table - Pump Out Available Transition Time

Description:

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.05	0.02	0.02	0.02	0.02

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - Clutch Connectivity Wrong Direction FP

Description: Fault pending time for cluch connectivity detecting wrong direction

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Gain

Description: Gain value to convert clutch pressure command to regulator valve command

Value Units: Gain (unitless)
X Unit: Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Offset

Description: Offset value to convert clutch pressure command to regulator valve command

Value Units: offset (kPa)
X Unit: Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	0	0	0	0	0	0

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
CeTRMR_e_C1_Clutch	153	153	4,096	153	153	160	153
CeTRMR_e_C2_Clutch	129	129	129	4,096	129	129	130
CeTRMR_e_C3_Clutch	175	175	175	175	4,096	175	811
CeTRMR_e_C4_Clutch	300	300	300	300	300	4,096	300
CeTRMR_e_C5_Clutch	143	143	143	143	544	143	4,096
CeTRMR_e_C6_Clutch	78	78	78	78	78	137	78
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
CeTRMR_e_C1_Clutch	153	4,096	4,096	4,096	4,096	4,096	153
CeTRMR_e_C2_Clutch	129	4,096	4,096	129	129	130	4,096
CeTRMR_e_C3_Clutch	175	4,096	175	4,096	175	811	4,096
CeTRMR_e_C4_Clutch	1,618	4,096	300	300	4,096	300	300
CeTRMR_e_C5_Clutch	143	4,096	143	544	143	4,096	544
CeTRMR_e_C6_Clutch	4,096	4,096	78	78	137	78	78
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	160	153	153	165	153	153	160
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	129	142	129	130
CeTRMR_e_C3_Clutch	175	1,496	175	4,096	4,096	4,096	811
CeTRMR_e_C4_Clutch	4,096	300	1,618	4,096	300	1,618	4,096
CeTRMR_e_C5_Clutch	143	4,096	143	544	4,096	856	4,096
CeTRMR_e_C6_Clutch	137	78	4,096	137	78	4,096	366
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
CeTRMR_e_C1_Clutch	160	153	153	4,096	153	153	160
CeTRMR_e_C2_Clutch	129	129	129	129	4,096	129	129
CeTRMR_e_C3_Clutch	175	175	175	175	175	4,096	175
CeTRMR_e_C4_Clutch	4,096	300	300	300	300	300	4,096
CeTRMR_e_C5_Clutch	143	143	143	143	143	544	143
CeTRMR_e_C6_Clutch	4,096	78	78	78	78	78	137
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 5

y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
CeTRMR_e_C1_Clutch	153	153	4,096	4,096	153	160	153
CeTRMR_e_C2_Clutch	130	129	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	811	175	4,096	175	4,096	175	1,496

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	300	1,618	4,096	300	300	4,096	300
CeTRMR_e_C5_Clutch	4,096	143	4,096	143	544	143	4,096
CeTRMR_e_C6_Clutch	78	4,096	4,096	78	78	137	78
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 6

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
CeTRMR_e_C1_Clutch	153	165	153	153	160	160	153
CeTRMR_e_C2_Clutch	4,096	129	142	129	130	129	129
CeTRMR_e_C3_Clutch	175	4,096	4,096	4,096	811	175	175
CeTRMR_e_C4_Clutch	1,618	4,096	300	1,618	4,096	4,096	300
CeTRMR_e_C5_Clutch	143	544	4,096	856	4,096	143	143
CeTRMR_e_C6_Clutch	4,096	137	78	4,096	366	4,096	78
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	199	129
CeTRMR_e_C3_Clutch	175	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	300	300	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	143	4,096	4,096	544	544	4,096	856
CeTRMR_e_C6_Clutch	4,096	78	78	137	137	366	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	4,096	4,096	249	160	153	165	
CeTRMR_e_C2_Clutch	142	130	374	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	811	4,096	1,496	4,096	4,096	
CeTRMR_e_C4_Clutch	2,000	4,096	4,096	4,096	1,618	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,665	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

Value Units: Pressure (kPa)
X Unit: Commanded Gear
Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
CeTRMR_e_C1_Clutch	57	57	4,096	57	57	59	57
CeTRMR_e_C2_Clutch	48	48	48	4,096	48	48	48
CeTRMR_e_C3_Clutch	65	65	65	65	4,096	65	301
CeTRMR_e_C4_Clutch	111	111	111	111	111	4,096	111
CeTRMR_e_C5_Clutch	53	53	53	53	202	53	4,096
CeTRMR_e_C6_Clutch	29	29	29	29	29	51	29
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
CeTRMR_e_C1_Clutch	57	4,096	4,096	4,096	4,096	4,096	57
CeTRMR_e_C2_Clutch	48	4,096	4,096	48	48	48	4,096
CeTRMR_e_C3_Clutch	65	4,096	65	4,096	65	301	4,096
CeTRMR_e_C4_Clutch	599	4,096	111	111	4,096	111	111
CeTRMR_e_C5_Clutch	53	4,096	53	202	53	4,096	202
CeTRMR_e_C6_Clutch	4,096	4,096	29	29	51	29	29
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 3

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
CeTRMR_e_C1_Clutch	59	57	57	61	57	57	59
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	48	53	48	48
CeTRMR_e_C3_Clutch	65	554	65	4,096	4,096	4,096	301
CeTRMR_e_C4_Clutch	4,096	111	599	4,096	111	599	4,096
CeTRMR_e_C5_Clutch	53	4,096	53	202	4,096	317	4,096
CeTRMR_e_C6_Clutch	51	29	4,096	51	29	4,096	136
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 4

y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
CeTRMR_e_C1_Clutch	59	57	57	4,096	57	57	59
CeTRMR_e_C2_Clutch	48	48	48	48	4,096	48	48
CeTRMR_e_C3_Clutch	65	65	65	65	65	4,096	65
CeTRMR_e_C4_Clutch	4,096	111	111	111	111	111	4,096
CeTRMR_e_C5_Clutch	53	53	53	53	53	202	53
CeTRMR_e_C6_Clutch	4,096	29	29	29	29	29	51
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 5

y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
CeTRMR_e_C1_Clutch	57	57	4,096	4,096	57	59	57
CeTRMR_e_C2_Clutch	48	48	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	301	65	4,096	65	4,096	65	554

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	111	599	4,096	111	111	4,096	111
CeTRMR_e_C5_Clutch	4,096	53	4,096	53	202	53	4,096
CeTRMR_e_C6_Clutch	29	4,096	4,096	29	29	51	29
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 6

y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
CeTRMR_e_C1_Clutch	57	61	57	57	59	59	57
CeTRMR_e_C2_Clutch	4,096	48	53	48	48	48	48
CeTRMR_e_C3_Clutch	65	4,096	4,096	4,096	301	65	65
CeTRMR_e_C4_Clutch	599	4,096	111	599	4,096	4,096	111
CeTRMR_e_C5_Clutch	53	202	4,096	317	4,096	53	53
CeTRMR_e_C6_Clutch	4,096	51	29	4,096	136	4,096	29
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 7

y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	74	48
CeTRMR_e_C3_Clutch	65	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	111	111	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	53	4,096	4,096	202	202	4,096	317
CeTRMR_e_C6_Clutch	4,096	29	29	51	51	136	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	4,096	4,096	92	59	57	61	
CeTRMR_e_C2_Clutch	53	48	139	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	301	4,096	554	4,096	4,096	
CeTRMR_e_C4_Clutch	741	4,096	4,096	4,096	599	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	617	
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

Description: Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

Value Units: Pressure (kPa)
X Unit: Possible Output Tie-up Combination (unitless)
Y Units: Clutch

y/x	CeTCLR_e_TUM_Out Lockl	CeTCLR_e_TUM_Out Lock2	CeTCLR_e_TUM_Out Lock3	CeTCLR_e_TUM_Out Lock4	CeTCLR_e_TUM_Out Lock5	CeTCLR_e_TUM_Out Lock6	CeTCLR_e_TUM_Out Lock7
CeTRMR_e_C1_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C2_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C3_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C4_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C5_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C6_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C7_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - Illegal Drive Clutch Combinations

Description: All combinations of clutch commands which can lead to reverse when the driver is requesting drive (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

y/x	CeTRMR_e_IllegalDrv_Rev1	CeTRMR_e_IllegalDrv_Rev2
CeTRMR_e_C1_Clutch	1	1
CeTRMR_e_C2_Clutch	1	1
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	1	1
CeTRMR_e_C5_Clutch	0	0
CeTRMR_e_C6_Clutch	1	1
CeTRMR_e_C7_Clutch	0	0

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

Description: All combinations of clutch commands which can lead to drive or reverse when the driver is requesting park or neutral (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Park-Neutral Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalPN_Rev	CeTRMR_e_IllegalPN_1A	CeTRMR_e_IllegalPN_1Ac	CeTRMR_e_IllegalPN_1Ad	CeTRMR_e_IllegalPN_1Af
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	1	0	0
CeTRMR_e_C4_Clutch	1	0	0	1	0
CeTRMR_e_C5_Clutch	0	1	1	1	1
CeTRMR_e_C6_Clutch	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalPN_1M	CeTRMR_e_IllegalPN_1Me	CeTRMR_e_IllegalPN_1Md	CeTRMR_e_IllegalPN_1Mf	CeTRMR_e_IllegalPN_2A
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	0
CeTRMR_e_C3_Clutch	0	1	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	0
CeTRMR_e_C6_Clutch	0	0	0	1	0
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalPN_2M	CeTRMR_e_IllegalPN_3	CeTRMR_e_IllegalPN_4	CeTRMR_e_IllegalPN_5	CeTRMR_e_IllegalPN_6
CeTRMR_e_C1_Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	0	0	0	0
CeTRMR_e_C3_Clutch	1	1	1	1	0
CeTRMR_e_C4_Clutch	1	1	1	0	1
CeTRMR_e_C5_Clutch	0	1	0	1	1
CeTRMR_e_C6_Clutch	0	0	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0

Illegal Park-Neutral Clutch Combinations - Part 4

y/x	CeTRMR_e_IllegalPN_7	CeTRMR_e_IllegalPN_8	CeTRMR_e_IllegalPN_9	CeTRMR_e_IllegalPN_10	
CeTRMR_e_C1_Clutch	0	0	0	0	
CeTRMR_e_C2_Clutch	0	1	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	1	0	1	1	
CeTRMR_e_C4_Clutch	1	1	0	1	
CeTRMR_e_C5_Clutch	1	1	1	0	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	0	

Initial Supporting table - Illegal Reverse Clutch Combinations

Description: All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Reverse Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalRev_1A	CeTRMR_e_IllegalRev_1Ac	CeTRMR_e_IllegalRev_1Ad	CeTRMR_e_IllegalRev_1Af	CeTRMR_e_IllegalRev_1M	CeTRMR_e_IllegalRev_1Me
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	1	0	0	0	1
CeTRMR_e_C4_Clutch	0	0	1	0	0	0
CeTRMR_e_C5_Clutch	1	1	1	1	1	1
CeTRMR_e_C6_Clutch	0	0	0	1	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1Md	CeTRMR_e_IllegalRev_1Mf	CeTRMR_e_IllegalRev_2A	CeTRMR_e_IllegalRev_2M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	0	1	0	0
CeTRMR_e_C3_Clutch	0	0	1	1	1	1
CeTRMR_e_C4_Clutch	1	0	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	0	0	1	0
CeTRMR_e_C6_Clutch	0	1	0	0	0	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Illegal Reverse Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IllegalRev_8	CeTRMR_e_IllegalRev_9	CeTRMR_e_IllegalRev_10
CeTRMR_e_C1_Clutch	1	1	0	0	0	0
CeTRMR_e_C2_Clutch	0	0	0	1	1	1
CeTRMR_e_C3_Clutch	1	0	1	0	1	1
CeTRMR_e_C4_Clutch	0	1	1	1	0	1
CeTRMR_e_C5_Clutch	1	1	1	1	1	0
CeTRMR_e_C6_Clutch	1	1	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	0

Initial Supporting table - Incorrect Direction Range Change Delay Time

Description: Time delay after PRNDL change before incorrect direction monitor will be enabled

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Incorrect Drive Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded drive condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Neutral Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded neutral condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Park Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded park condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Reverse Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded reverse condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P0723 (MY21) transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

Value Units: seconds
seconds

y/x	-40	0	40
1	5	3	1

Initial Supporting table - P0723 Wheel Speed Calc

Description:

y/x	400	500	600	700	800
1	300	375	450	525	600

Initial Supporting table - P0741 GR10 torque converter K factor fail limit

Description:

Value Units: transmission torque converter K factor
X Unit: transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

y/x	0.000	0.100	0.200	0.300	0.500	0.700	0.800	0.945	0.950
1	400.0	300.0	225.0	200.0	200.0	200.0	250.0	1,000.0	16,383.8

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P187D P18E7 Park to Out Of Park Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.00	2.00	1.00	0.80	0.80

Initial Supporting table - P187E P18E8 Out Of Park to Park Min Line Transition Delay

Description: Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.80	2.40	1.20	1.20	1.20

Initial Supporting table - P187E P18E8 Out Of Park to Park Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2.40	1.20	0.60	0.60	0.60

Initial Supporting table - P18A1 P18AA P27EC Mode Valve High To Low Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.60	0.80	0.25	0.07	0.07

Initial Supporting table - P18AA Mode Valve High To Low Min Line Transition Delay

Description: Transition delay before fail timer can increment for line pressure cut controlled transitions, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	4.70	2.00	0.80	0.43	0.26

Initial Supporting table - P18AB P27EC Mode Valve Low to High Transition Delay

Description: Transition delay before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	1.20	0.60	0.20	0.10	0.08

Initial Supporting table - P18AE Enable Valve Test Delay

Description: Time enable conditions must be met before fail timer can increment, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.50	0.30	0.16	0.08	0.08

Initial Supporting table - P18AE Max Crank Time

Description: Test Abort Crank Time

Value Units: Seconds
X Unit: Deg C

y/x	-40	-20	0	20	130
1	5	5	5	5	5

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - P2818 GR10 Oncoming Clutch Capacity Offset

Description: Primary Oncoming Clutch Capacity Offset from return spring pressure

Value Units: kPa
X Unit: Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	50	50	50	50	50	50

Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.200	0.100

Initial Supporting table - P2820 GR10 hydraulic default at launch test window

Description:

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	0	0	1	1	1

Initial Supporting table - P2820 GR10 hydraulic default input speed deceleration threshold

Description: Negative acceleration needed to increment fail timer for GR10 default disable solenoid stuck off at launch diagnostic

Value Units: RPM/sec
X Unit: °C

y/x	-10	5	15	30	110
1	-32,768	-32,768	-3,500	-2,000	-2,000

Initial Supporting table - Park Inhibit Solenoid Override Line Pressure

Description: Line pressure that is expected to be able to overcome the PISA and force the transmission into Park, looked up based on transmission fluid temperature

Value Units: kPa
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2,000.00	2,000.00	2,000.00	2,000.00	2,000.00

Initial Supporting table - Pump Out Available Transition Time

Description: Delay before pump out available flag is set TRUE, looked up based on transmission fluid temperature

Value Units: Seconds
X Unit: Deg C

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	0.05	0.02	0.02	0.02	0.02

Initial Supporting table - Ratio Monitor Clutch States

Description: Array of valid combinations of clutch held/off which constitues a valid gear (1 = clutch held, 0 = clutch off)

Value Units: Clutch Held Boolean
X Unit: Gear
Y Units: Clutch

Ratio Monitor Clutch States - Part 1

y/x	CeTRMR_e_GRX_GearR	CeTRMR_e_GRX_Gear1A	CeTRMR_e_GRX_Gear1Ac	CeTRMR_e_GRX_Gear1Ad	CeTRMR_e_GRX_Gear1Af
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	0	0	1	0	0
CeTSER_e_C4_Clutch	1	0	0	1	0
CeTSER_e_C5_Clutch	0	1	1	1	1
CeTSER_e_C6_Clutch	1	0	0	0	1

Ratio Monitor Clutch States - Part 2

y/x	CeTRMR_e_GRX_Gear1M	CeTRMR_e_GRX_Gear1Me	CeTRMR_e_GRX_Gear1Md	CeTRMR_e_GRX_Gear1Mf	CeTRMR_e_GRX_Gear2A
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	1	1	1	0
CeTSER_e_C3_Clutch	0	1	0	0	1
CeTSER_e_C4_Clutch	0	0	1	0	1
CeTSER_e_C5_Clutch	1	1	1	1	0
CeTSER_e_C6_Clutch	0	0	0	1	0

Ratio Monitor Clutch States - Part 3

y/x	CeTRMR_e_GRX_Gear2M	CeTRMR_e_GRX_Gear3	CeTRMR_e_GRX_Gear4	CeTRMR_e_GRX_Gear5	CeTRMR_e_GRX_Gear6
CeTSER_e_C1_Clutch	1	1	1	1	1
CeTSER_e_C2_Clutch	1	0	0	0	0
CeTSER_e_C3_Clutch	1	1	1	1	0
CeTSER_e_C4_Clutch	1	1	1	0	1
CeTSER_e_C5_Clutch	0	1	0	1	1
CeTSER_e_C6_Clutch	0	0	1	1	1

Ratio Monitor Clutch States - Part 4

y/x	CeTRMR_e_GRX_Gear7	CeTRMR_e_GRX_Gear8	CeTRMR_e_GRX_Gear9	CeTRMR_e_GRX_Gear10	
CeTSER_e_C1_Clutch	0	0	0	0	
CeTSER_e_C2_Clutch	0	1	1	1	
CeTSER_e_C3_Clutch	1	0	1	1	
CeTSER_e_C4_Clutch	1	1	0	1	
CeTSER_e_C5_Clutch	1	1	1	0	

Initial Supportin   table - Ratio Monitor Clutch States

CeTSER_e_C6_Clutch	1	1	1	1	

Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)

Description: Ratio Monitor Fail Increment Rate

Value Units: Percent Increment Per Loop
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Ratio Monitor Slip Threshold

Description: Threshold slip value below which the clutch is considered holding

Value Units: clutch slip (RPM)
X Unit: Clutch

y/x	CeTRMR_e_ClchSlipC1	CeTRMR_e_ClchSlipC2	CeTRMR_e_ClchSlipC5	CeTRMR_e_ClchSlipC3C4	CeTRMR_e_ClchSlipC3C6	CeTRMR_e_ClchSlipC4C6
1	30	30	30	25	25	25

Initial Supporting table - Shift Monitor Lowest Allowed Gear

Description: Y axis shows lowest allowed gear for the current vehicle speed and transfer case range

Value Units: Vehicle Speed (kph)
X Unit: Transfer Case Range
Y Units: Lowest Allowed Gear

y/x	CeTCLR_e_4WD_Hi	CeTCLR_e_4WD_Lo
CeTGRR_e_Gear1	47	18
CeTGRR_e_Gear2	74	28
CeTGRR_e_Gear3	104	38
CeTGRR_e_Gear4	126	47
CeTGRR_e_Gear5	146	54
CeTGRR_e_Gear6	174	65
CeTGRR_e_Gear7	222	82
CeTGRR_e_Gear8	260	96
CeTGRR_e_Gear9	323	119
CeTGRR_e_Gear10	350	130

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2797 hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds
X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P2797 predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	100.0	100.0	150.0	200.0	250.0	250.0	250.0

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.650	0.650	0.650	0.500	0.500

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description: intermediate speed sensor 1 or 2 predicted direction

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1

y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2

y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3

y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4

y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	350	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	0	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cell/Global Positioning System Combined Antenna Coaxial Signal	B13AA	Short to Battery The emissions neutral default action for all diagnotics under DTC B13AA is to disable adaptive cruise control and/or Super Cruise	The purpose of this DTC is to detect short to positive of GPS(secondary) antenna circuit. DTC is set when the latest 6 consecutive GPS(secondary) antenna ADC values are under the open/short threshold defined in DID and ANT_PT_SENSE values is high.	Short to Battery Threshold = 1.53 - 2.35 V	Diagnoic Calibration Enabled	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStaron mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic
		Short to Ground	The purpose of this DTC is to detect short to ground of GPS(secondary) antenna circuit. Short to Ground DTC is set when the GPS(secondary) Antenna ADC value is under the open/short threshold defined in DID and	ANT_PT_SENSE(GPIO) is low state - GPS Antenna Short to Ground DTC Voltage Lower Value Threshold = 0.05V	Diagnoic Calibration Enabled	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStaron mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT_SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic
		Open Circuit	The purpose of this DTC is to detect open of GPS(secondary) antenna circuit. DTC is set when the latest 6 consecutive GPS(secondary) antenna ADC values are between open/short threshold and connect/open threshold defined in DID.	GPS Antenna Open DTC Voltage Upper Value Threshold = 0.2V	Diagnoic Calibration Enabled	Vehicle Power Mode condition: ACCESSORY, RUN Algorithm will be started just after TCP is getting to OnStar on mode.	After the end of boot sequence, modem sends GPS(secondary) antenna ADC value and ANT_PT SENSE value to MDM via LocAPI every second. MDM checks GPS(secondary) antenna state with these values.	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with External Object Calculating Module/EOCM_HCP1 on CAN Bus 2	U1615	Upon notification by the handler that the associated supervised signal has failed supervision (typically 2.5 times the nominal periodic rate of the monitored signal. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	Signals not detected for 2.5 times the sampling rate	Fault Detected	Test Results shall not be considered valid if any of the following are true: • U161500_ENABLE = disabled • within the first 5 seconds of o a power-up reset o a running reset o a recovery from an under voltage condition or a recovery from an overvoltage condition. • When a bus off condition (U007X) is current, the Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met. ■ Transport mode is active3	• Vehicle Supply voltage is within a calibratable rangel (k_Battery Voltage Low Threshold and k_Battery Voltage High Threshold). • Monitored PDUs/Signals are specified as part of the active partial network(s). • Any PN that the monitored PDU/Signal is mapped to has been active for 5 seconds or longer. This timer only resets when the Signal/PDU becomes inactive due to PN(s) deactivation(s).	Continuously	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the External Object Calculation Module 1. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to the final Key AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power up. 3) Monitored whileRID 0x0200; Provision Security Peripheral	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received.	Safety Non-MIL Emission neutral Diagnostic
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196192_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable To Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthenticationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Module Low Content Internal/Programming failures	U3000	Control Module General Checksum Failure. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3000.	The purpose of this DTC is to detect checksum failure of NAND Flash File System. DTC is set only when partition mount failed at boot up time. And during run-time, file monitor daemon (It's name is "cfm-daemon") will request system reboot when detect error then system has a chance to repair the problem file system (try fix up or try format) at boot up time, if system couldn't recover file system and fail to mount it then DTC will be set.	= Fault Detected	Exceptions: Algorithm shall not run if; Diagnostic Calibration E = disabled	Vehicle Power Mode condition: ACCESSORY, RUN 'DTC is set when file system not mounted.	Power On Diagnostics	Safety Non-MIL Emission neutral Diagnostic
		Control Module Data Memory Failure	General Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage U300042_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Program Memory Failure	Program Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage Dignostic_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Control Module Calibration / Parameter Memory Failure	TCP has not been calibrated/configured or calibration process failed indicated by: k_default_calibration	 = True	Vehicle Supply Voltage U300054_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Watchdog and Safety Microcontroller Failure	The purpose of DTC is to detect watchdog happened in previous cycle. It just only show watch dog was happened.	DTC is set when register value is same to written value in the previous cycle.	Exceptions: Algorithm shall not run if; Diagnostic Calibration disabled	Vehicle Power Mode condition: RUN	Running Diagnostics	Safety Non-MIL Emissions Neutral Diagnostic
		Control Module Internal Electronic Failure	Internal circuit failure is detected	Fault Detected	Diagnostic_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously and at Startup.	Safety Non-MIL Emission neutral Diagnostic
		Control Module Not Configured	Sensor operating software not sucessfully flashed on to the microcontroller	= Fault detected	Vehicle Supply Voltage Calibration_ENABLE OBD Manufacturing Enable Counter Power Mode = Run Time since power up reset or running reset or under voltage or over voltage condition event ECU_COMM_Active Any Partial Network that the ECU participates in	9V < voltage < 16V = Enabled = 0 > 5 seconds > 5 seconds = True	Checked every 0.01000 seconds	Safety Non-MIL Emission neutral Diagnostic
		Control Module Component Internal Failure	Internal circuit failure is detected	Fault Detected	Diagnostic_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously and at Startup.	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Left Front Camera Temperature Above Threshold	B0205	Temperature of imager is above threshold Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data The default action depends on the downstream consumer.	Camera internal temperature above threshold.	105C	Diagnostic Calibration Enabled	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Right Front Camera Temperature Above Threshold	B0206	Temperature of imager is above threshold Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	Camera internal temperature above threshold.	105C	Diagnostic Calibration Enabled	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Rear Vision Camera Low Voltage Differential Signaling LVDS Coaxial Signal	B1594	Circuit Short To Ground on LVSD signal between from VPM module and remote camera. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	Short to ground is detected	Fault Detected	LVDS Coaxial Signal Circuit Short to Ground DTC Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Circuit Open on LVSD signal between from VPM module and remote camera	Open circuit failure is detected	Fault Detected	LVDS Coaxial Signal Circuit Open DTC Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Signal Invalid - The signal from the camera to the VPM is invalid	This sub-function shall set Rear Camera Failure Signal Invalid Diagnostic Fault Active = TRUE when video signal is not detected or no current draw.	Fault Detected	K_Rear_Camera_Failure_Signal_Invalid_Diagnostic_Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Alive / Sequence Counter Incorrect / Not Updated - Monitors if the camera has a hardware or software error and 'freezes' - no longer sending new image data	ARC/Sequency Number not updated	Fault Detected	Diagnostic Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Vision Camera Low Voltage Differential Signaling LVDS Coaxial Signal	B1595	Circuit Short To Ground on LVSD signal between from VPM module and remote camera Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	Short to ground is detected	Fault Detected	LVDS Coaxial Signal Circuit Short to Ground DTC Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Circuit Open on LVSD signal between from VPM module and remote camera	Open circuit failure is detected	Fault Detected	LVDS Coaxial Signal Circuit Open DTC Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Signal Invalid - The signal from the camera to the VPM is invalid	This sub-function shall set Rear Camera Failure Signal Invalid Diagnostic Fault Active = TRUE when video signal is not detected or no current draw.	Fault Detected	K_Front_Camera_Failure_Signal_Invalid_Diagnostic_Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Alive / Sequence Counter Incorrect / Not Updated - Monitors if the camera has a hardware or software error and 'freezes' - no longer sending new image data	ARC/Sequency Number not updated	Fault Detected	Diagnostic Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
Right Side Curb Camera Low Voltage Differential Signaling LVDS Coaxial Signal	B1597	Circuit Short To Ground on LVSD signal between from VPM module and remote camera Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	Short to ground is detected	Fault Detected	LVDS Coaxial Signal Circuit Short to Ground DTC Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Circuit Open on LVSD signal between from VPM module and remote camera	Open circuit failure is detected	Fault Detected	LVDS Coaxial Signal Circuit Open DTC Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Signal Invalid - The signal from the camera to the VPM is invalid	This sub-function shall set Rear Camera Failure Signal Invalid Diagnostic Fault Active = TRUE when video signal is not detected or no current draw.	Fault Detected	K_RightSideCurb_Camera_Failure_Signal_Invalid_Diagnostic_Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Alive / Sequence Counter Incorrect / Not Updated - Monitors if the camera has a hardware or software error and 'freezes' - no longer sending new image data	ARC/Sequency Number not updated	Fault Detected	Diagnostic Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
Left Side Curb Camera Low Voltage Differential Signaling LVDS Coaxial Signal	B1598	Circuit Short To Ground on LVSD signal between from VPM module and remote camera Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	Short to ground is detected	Fault Detected	LVDS Coaxial Signal Circuit Short to Ground DTC Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Circuit Open on LVSD signal between from VPM module and remote camera	Open circuit failure is detected	Fault Detected	LVDS Coaxial Signal Circuit Open DTC Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION for more than 5 seconds Battery Voltage is between 9 and 16 Volts 5 Seconds after a recovery from an under or over voltage condition Operational Software is Executing	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Signal Invalid - The signal from the camera to the VPM is invalid	This sub-function shall set Rear Camera Failure Signal Invalid Diagnostic Fault Active = TRUE when video signal is not detected or no current draw.	Fault Detected	K_LeftSideCurb_Camera_Failure Signal Invalid_Diagnostic_Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Alive / Sequence Counter Incorrect / Not Updated - Monitors if the camera has a hardware or software error and 'freezes' - no longer sending new image data	ARC/Sequency Number not updated	Fault Detected	Diagnostic Enable = TRUE	Vehicle Power Mode = ACCY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
Rear Camera	B1A62	Missing Calibration Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	This sub-function shall set Rear Camera Failure Calibration Not Learned Diagnostic Fault Active = TRUE when the camera calibration process is failed.	Fault Detected	K_Rear_Camera_Failure_Calibration_Not_Learned_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Wrong Mounting Position	This sub-function shall set Rear Camera Failure Wrong Mounting Position Diagnostic Fault Active = TRUE when the camera is determined to be in the wrong mounting position.	Fault Detected	K_Rear_Camera_Failure_Wrong_Mounting_Location Diagnostic Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Performance or Incorrect Operation	This sub-function shall set Rear Camera Reconnection Failure Diagnostic Fault Active = TRUE when VPM has never been aligned and calibration (MTC alignment) has failed.	Fault Detected	K_Rear_Camera_Reconnection_Failure_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Component or System Over Temperature	Camera internal temperature above threshold.	105C	Diagnostic = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Rear Vision Camera Temperature Below Threshold	Camera internal temperature below threshold	-30C	Diagnostic = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Front Camera	B1A68	Missing Calibration Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	This sub-function shall set Front Camera Failure Calibration Not Learned Diagnostic Fault Active = TRUE when the camera calibration process is failed.	Fault Detected	K_Front_Camera_Failure_Calibration_Not_Learned_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Wrong Mounting Position	This sub-function shall set Front Camera Failure Wrong Mounting Position Diagnostic Fault Active = TRUE when the camera is determined to be in the wrong mounting position.	Fault Detected	K_Front_Camera_Failure_Wrong_Mounting_Location_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Performance or Incorrect Operation	This sub-function shall set Front Camera Reconnection Failure Diagnostic Fault Active = TRUE when VPM has never been aligned and calibration (MTC alignment) has failed.	Fault Detected	K_Front_Camera_Reconnection_Failure_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Component or System Over Temperature	Camera internal temperature above threshold.	105C	Diagnostic = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Front Vision Camera Temperature Below Threshold	Camera internal temperature below threshold	-30C	Diagnostic = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Side Vision Camera - Left	B1A69	Missing Calibration Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	This sub-function shall set Side Left Camera Failure Calibration Not Learned Diagnostic Fault Active = TRUE when the camera calibration process is failed.	Fault Detected	K_SideLeft_Camera_Failure_Calibration_Not_Learned_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Wrong Mounting Position	This sub-function shall set Side Left Camera Failure Wrong Mounting Position Diagnostic Fault Active = TRUE when the camera is determined to be in the wrong mounting position.	Fault Detected	K_SideLeft_Camera_Failure_Wrong_Mounting_Location_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Performance or Incorrect Operation	This sub-function shall set Side Left Camera Reconnection Failure Diagnostic Fault Active = TRUE when VPM has never been aligned and calibration (MTC alignment) has failed.	Fault Detected	K_SIdeLeft_Camera_Reconnection_Failure_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Component or System Over Temperature	Camera internal temperature above threshold.	105C	Diagnostic = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Side Left Vision Camera Temperature Below Threshold	Camera internal temperature below threshold	-30C	Diagnostic = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Side Vision Camera - Right	B1A6A	Missing Calibration Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	This sub-function shall set Side Right Camera Failure Calibration Not Learned Diagnostic Fault Active = TRUE when the camera calibration process is failed.	Fault Detected	K_SideRight_Camera_Failure_Calibration_Not_Learned_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Wrong Mounting Position	This sub-function shall set Side Right Camera Failure Wrong Mounting Position Diagnostic Fault Active = TRUE when the camera is determined to be in the wrong mounting position.	Fault Detected	K_SideRight_Camera_Failure_Wrong_Mounting_Location_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Performance or Incorrect Operation	This sub-function shall set Side Right Camera Reconnection Failure Diagnostic Fault Active = TRUE when VPM has never been aligned and calibration (MTC alignment) has failed.	Fault Detected	K_SideRight_Camera_Reconnection_Failure_Diagnostic_Enable = TRUE	Vehicle Power Mode = OFF, ACCESSORY, RUN or PROPULSION	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Component or System Over Temperature	Camera internal temperature above threshold.	105C	Diagnostic = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Side Right Vision Camera Temperature Below Threshold	Camera internal temperature below threshold	-30C	Diagnostic = Enabled.	Vehicle Power Mode Condition: OFF, ACCESSORY, RUN ECU Operational Condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
Lost Communication with External Object Calculating Module/EOCM_HCP1 on CAN Bus 1	U1614	Upon notification by the handler that the associated supervised signal has failed supervision (typically 2.5 times the nominal periodic rate of the monitored signal. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	Signals not detected for 2.5 times the sampling rate	Fault Detected	Test Results shall not be considered valid if any of the following are true: • U161400_ENABLE = disabled • within the first 5 seconds of o a power-up reset o a running reset o a recovery from an under voltage condition or a recovery from an overvoltage condition. • When a bus off condition (U007X) is current, the Lost Communications DTCs shall not set but the failsoft action shall occur if conditions to set the DTC are met. • Transport mode is active3	• Vehicle Supply voltage is within a calibratable rangel (k_Battery Voltage Low Threshold and k_Battery Voltage High Threshold). • Monitored PDUs/Signals are specified as part of the active partial network(s). • Any PN that the monitored PDU/Signal is mapped to has been active for 5 seconds or longer. This timer only resets when the Signal/PDU becomes inactive due to PN(s) deactivation(s).	Continuously	Safety Non-MIL Emission neutral Diagnostic
Invalid Data Received from External Object Calculating Module 1	U053B	Detects Alive Rolling Counter (ARC) or Message Authentification Code (MAC) error in messages received from the External Object Calculation Module 1. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	The following messages are monitored for failed safety, security, continuous operation or protection and this code sets if a message fails any of these criteria for the timeout period HstVehPathParms_Prtctd_MSG	= 0.02500 seconds (timeout)	Vehicle Supply Voltage PNC_ActiveTxPDUEnable Time since power up reset or running reset or under voltage or over voltage condition event OBD Manufacturer Enable Counter	9V < voltage < 16V = True > 5 seconds = 0	Dependent upon receipt of each monitored signal from the External Object Calculation Module 1 Fault maturation time is 0.02500 seconds	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Key Table Not Provisioned	U1960	The confirmed status for this DTC indicates that at least one Security Peripheral General Key must be provisioned. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	The Authoritative Counter Any single Key Slot Provision State Flag for Key 2 through to the final Key AND OBD Manufacturing Enable Counter ERC_KEY_EMPTY	= Max Value = 0 = 0 = TRUE	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196000_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event All of the previous conditions plus any one of the following: 1) Monitored continuously while CAN frames are being transmitted and received. 2) Checked at ECU power up. 3) Monitored whileRID 0x0200; Provision Security Peripheral	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received.	Safety Non-MIL Emission neutral Diagnostic
Security Peripheral Performance - Performance or Incorrect Operation	U1961	The confirmed status for this DTC indicates that the Front Camera Module Low Content (FCM_LC) must be replaced due to an internal error. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer.	1) The security peripheral is considered to have failed if a request to the security peripheral cannot generate a Message Authentication Code (MAC) due to an internal error (not due to software timeouts). 2) The security peripheral is considered to have failed if a request to the security peripheral cannot verify a Message Authentication Code (MAC) due to an internal error (not due to software timeouts).	= Fault Detected	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime U196192_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	9V < voltage < 16V = True >= 5 seconds = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable To Authenticate Serial Data Message	U1962	Monitors incoming message authentification code and compares with the expected based on message source. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. It should noted not all devices with incorrect authentication will set the default action - only applies to adaptive cruise critical devices.	A Message Authentication Code results in failed verification for a calibratable number of consecutive verification attempts for a specific key slot number of consecutive failures failures	> k_ERRH_C_FailedAuthenticationCounter	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SerialDataAuthenticationPowerModeTime Fault CodeU196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over	9V < voltage < 16V = True >= 2 seconds = Inactive = Enabled = Inactive > 5 seconds	Monitored continuously while CAN frames are being transmitted and received	Safety Non-MIL Emission neutral Diagnostic
Module Low Content Internal/Programming failures	U3000	Control Module General Checksum Failure. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3000.	Internal Front Camera Module Low Content (FCM_LC) Memory Checksum Failure Detected.	= Fault Detected	Vehicle Supply Voltage U300041_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Data Memory Failure	General Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage U300042_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Program Memory Failure	Program Memory Failure Detected	= Fault Detected	Vehicle Supply Voltage Dignostic_ENABLE	9V < voltage < 16V = Enabled	Continuously	Safety Non-MIL Emission neutral Diagnostic
		Control Module Internal Electronic Failure	VPM internal circuit failure is detected	Fault Detected	Diagnostic_ENABLE = Enabled.	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously and at Startup.	Safety Non-MIL Emission neutral Diagnostic
		Control Module Over Temperature	VPM internal temperature above threshold	75C	Diagnostic_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic
		Control Module Component or System Under Temperature	VPM internal temperature blow threshold	-40C	Diagnostic_ENABLE = Enabled	Vehicle Power Mode condition: OFF, ACCESSORY, RUN ECU Operational condition: 9-16v	Continuously	Safety Non-MIL Emissions Neutral Diagnostic

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Vehicle Identification Number - Not Programmed or Incompatible	U3002	Diagnostic detects VIN not programmed	This diagnostic shall fail if VIN stored in EEPROM contains all bytes such that: VIN EEPROM	= OxFF	Vehicle Supply Voltage Vehicle Power Mode U300251_ENABLE OBD Manufacturer Enable Counter	9V < voltage < 16V = Run = Enabled = 0	Startup	
		This diagnostic detects a VIN mismatch	Any digit of the programmed VIN does not match the digits of the VIN transmitted over the GMLAN. In addition, the VIN numbers programmed in EEPROM are NOT all OxFF's such that: VIN Stored AND VIN Stored	Does not equal VIN transmitted over GMLAN Does not equal to OxFF	Vehicle Supply Voltage Vehicle Power Mode U300256_ENABLE OBD Manufacturer Enable Counter	9V < voltage < 16V = Run = Enabled = 0	Startup	Safety Non-MIL Emission neutral Diagnostic
Battery Supply Voltage	U3003	Battery Voltage - Circuit Voltage Below Threshold. Upon fault detection, the emissions neutral default action of either 1) disabling adaptive cruise control, 2) or no longer using controller provided data. The default action depends on the downstream consumer. Applies for all diagnostics listed under U3003.	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	< 9.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300316_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic
		Battery Voltage - Circuit Voltage Above Threshold	Front Camera Module Low Content (FCM_LC) supply voltage (Vsup)	> 16.0 +/-0.5 volts	Vehicle Power Mode = Run Virtual Network Condition: Any Partial Network that the ECU participates in is active. U300317_ENABLE	> 5 seconds = Enabled	3.000 Seconds	Safety Non-MIL Emission neutral Diagnostic