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 HVACHMI FFP AC 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 HVACHMI FFP AC 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 HVACHMI 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 HVACHMI 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 <= 2.70V >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 HVACHMI 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 HVACHMI 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 HVACHMI 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 HVACHMI 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 HVACHMI FFPAUTO 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 HVACHMI FFPAUTO 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 FFPAUTO 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 HVACHMI FFP Blower Continuous Toggle is Out of Range High (OORH).The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Blower Continuous Toggle 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 Face Plate Request Blower Level Front Raw Voltate(1)is	>= 2.80 V	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.
Front Faceplate Blower Continuous Control Front (1) Circuit Low	B2A3F	This DTC will detect when the sensed voltage of HVACHMI FFP Blower Continuous Toggle is Out of Range Low (OORL).The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Blower Continuous Toggle 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 Face Plate Request Blower Level Front Raw Voltate(1)is	<= 0.60 V	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.
Front Faceplate Blower Continuous Control Front (1) Performance	B2A41	This DTC will detect when the HVAC HMI FFP Blower Continuous Toggle 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 Blower Continuous Toggle 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 Blower Level Front Raw Voltage is between AND FOR	<= 2.70 V >= 1.30 V >90.00 sec	Diagnostics is Enabled No Active DTCs	**B2A3E, B2A3F, 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.
Front Faceplate Blower Continuous Control Front (2) Circuit High	B2A42	This DTC will detect when the sensed voltage of HVACHMI FFP Blower Continuous Toggle is Out of Range High (OORH).The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Blower Continuous Toggle 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 Face Plate Request Blower Level Front Raw Voltate (2) is	>= 2.80 V	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.
Front Faceplate Blower Continuous Control Front (2) Circuit Low	B2A43	This DTC will detect when the sensed voltage of HVACHMI FFP Blower Continuous Toggle is Out of Range Low (OORL).The DTC is enabled when the enable criteria is met, and the FFP monitors and sends the Blower Continuous Toggle 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 Face Plate Request Blower Level Front Raw Voltate (2) is	<= 0.60 V	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.
Front Faceplate Blower Continuous Control Front (2) Performance	B2A45	This DTC will detect when the HVAC HMI FFP Blower Continuous Toggle 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 Blower Continuous Toggle 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 Blower Level Front Raw Voltage is between AND FOR	<= 2.70 V >= 1.30 V >90.00 sec	Diagnostics is Enabled No Active DTCs	**B2A42, B2A43, 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.
Front Faceplate Max Defrost Control Circuit High	B2A67	This DTC will detect when the sensed voltage of HVACHMI 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 HVACHMI 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 HVACHMI 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 HVACHMI 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	>= 1.40 V <= 3.00 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 notan 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 notan 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:		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 Check Performance Diagnostic Enabled calibration is **TRUE**	= TRUE		
					Controller is awake	= TRUE		
					Front blower power short fault status	# Fault		
					Front blower ground short fault status	# Fault		
					Front blower open fault status	# Fault		
					Front blower feedback Duty Cycle percent	!(>=0.00 &<=10.00)		
					Front blower feedback Duty Cycle percent	!(>=90.00 &<=100.00)		
					Front blower feedback frequency (Hz)	(>45.00 &< 250.00)		
					No Active DTC	B2B00, B2B01, B2B02, B2B03, B2B0B, B2B0C		
					Commanded front blower speed current and previous duty cycle has changed by:	<=1 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					wait for:	>= 10.0 sec		
					Commanded front blower Speed Duty cycle	>10.0%		
					All of the following conditions are met for:			
					Condition 1: Climate System Mode is changed to: then Wait for:	Propulsion or Ignition On >=30.0 sec		
					or			
					Condition 2: Outside Air Temperature Filtered	<= 30.0 degC		
					Condition 3: Commanded front blower Speed duty cycle	<= 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	Upto 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.
						Actuator Performance Diagnostic Future Position Desired MINUS 5,000.00		
					"iii) Front Left Temp Actuator Actual position <	< 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:		Diagnostic is Enabled		120.00 s	
			All of the conditions are met:		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:			
			b) Front Left Temp Actuator Actual Position	> Front Left Temp Actuator Future Position Commanded+ 5,000 steps	a) Diagnostic failure is True	=TRUE		
					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 a n X o f 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 <	< 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		
			Failure Case 3:		Diagnostic is Enabled		120.00 s	
			All of the conditions are met:		Front Right Temp Actuator Diagnostics Global enable Calibration is TRUE	= TRUE		
			Front Right Temp Actuator Future Position Performance Fail Timer	> 120.00 s	No Active Loss of Communication DTC's	U065A		
			Any of the conditions below are satisfied:		Front Right Temp Actuator Actual Position Signal - Failed Continuous Operation Fault Active	B2B2D		
			a) Front Right Temp Actuator Actual Position	< Front Right Temp Actuator Future Position Commanded - 5,000 steps	Only one of the following condition (a) or (b) is met:			
			b) Front Right Temp Actuator Actual Position	> Front Right Temp Actuator Future Position Commanded+ 5,000 steps	a) Diagnostic failure is True	=TRUE		
					b) All of the following are met:			
					i) Front Right Temp Actuator Performance Diagnostic Allowable Stalled Movement Range is equal to Normal	=Normal		
					"ii) Front Right Temp			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Actuator Actual position > "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 MINUS 5,000.00 < Front Right 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.
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:		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 High 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.
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: Front Blower Speed Diagnostic Enabled calibration is **TRUE** Front Blower Feedback Check Out of Range Low 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.
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, 1 Trip No MIL Emissions Neutral

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	Upto 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 30.00 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: 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:		Diagnostic is Enabled		Upto 120.00 Seconds (includes time for the actuator to perform the retries referenced in the fail criteria)	
					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	Only one of the following condition (a) or (b) is met:			
			Front Left Temp Actuator Suspend Learn	= True	a) Diagnostic failure is latched	=TRUE		
			The failure condition latch will be cleared all the following conditions are met for at least one execution:		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	Upto 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	Upto 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 execution:All 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 30.00 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 120.00 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	<= 12,653 steps		
					iv) Front Right Temp Actuator Actual Position	>= 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.
Park Switch Stuck Closed	B2BA2	Controller specific software that diagnoses the Shifter Park Switch Stuck Closed (in park state) condition. In this monitor, Shifter Park Switch state is compared against the Transmission Shift Lever Position signal from TCM. If Transmission Shift Lever Position signal is not in Park but Shifter Park Switch is in closed state for X out of Y counts then this DTC gets set.	Shifter Park Switch is	= PARK	All of the following conditions are met: Park Switch Closed Diagnostic Enable is **CbTRUE** No Active Lost Communication with Transmission Control Module DTC System 12V Battery Voltage is above threshold System 12V Battery Voltage Out of Range Delay has Elapsed Transmission Shift Lever Position is NOT equal to Park	= TRUE U0101 > 11.00 volts (with hysteresis disable < 10.00 volts) > 0.00 milliseconds NOT equal to PARK	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.
Park Switch Stuck Open	B2BA3	Controller specific software that diagnoses the Shifter Park Switch Stuck Open (not in park state) condition. In this monitor, Shifter Park Switch state is compared against the Transmission Shift Lever Position signal from TCM. If Transmission Shift Lever Position signal is in Park but Shifter Park Switch is in open state for calibratable fail threshold count, then this DTC gets set. And, if Transmission Shift Lever Position signal is in Park and Shifter Park Switch is in closed state for consecutively calibratable pass threshold counts then this diagnostic is passed.	Shifter Park Switch is	NOT equal to PARK	All of the following conditions are met: Park Switch Closed Diagnostic Enable is **CbTRUE** No Active Lost Communication with Transmission Control Module DTC System 12V Battery Voltage is above threshold System 12V Battery Voltage Out of Range Delay has Elapsed Transmission Shift Lever Position is equal to PARK	= TRUE U0101 > 11.00 volts (with hysteresis disable < 10.00 volts) > 0.00 milliseconds = PARK	Diagnostic will fail with 120.00 seconds of continuous fail counts Diagnostic will pass with 0.03 seconds of continuous pass counts	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	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 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.
		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 upto 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:		8 seconds out of a 10 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		
					IBS Temperature Performance Diagnostic Enable is **TRUE**	= TRUE		
					IBS Temperature Performance Continuous 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		
					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.
			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 AMn		

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:		8 seconds out of a 10 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		
					Battery Monitor Module Voltage Performance 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		
					No Active Battery Voltage Out of Range DTCs	= P16D400, P16D500		
					Powertrain Crank Active is **FALSE**	= FALSE		
					Post-Crank Time Delay has elapsed	>5,000.00 seconds		

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 input that 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 input that is too high (out-of-range high).	Analog Mode Switch high voltage threshold	> 4.7170 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 input that 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 1.0250 < sensed voltage < 1.1025 1.5220 < sensed voltage < 1.5976 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: System 12V Battery Voltage is above threshold IBS NormalCommEnable is **TRUE** Outside Air Temperature is within range Temperature 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.
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	= NORMAL		
					Value of Propulsion System Off Timer is	> 28,800.00 (Seconds)		
					No Active AC_Evaporator Air Temperature (EAT) Out of Range High Fault Active	P0538		
					No Active AC_Evaporator Air Temperature (EAT) Out of Range Low Fault Active	P0537		
					No Active AC_Evaporator Air Temperature (EAT) Circuit Fault Active	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:		Time since power-up reset, running reset, recovery from under/over voltage condition	>= 5,000 milliseconds	Fastest periodic communication rate to Battery Monitor Module on LIN bus executes at 250ms.	Type B, 2 Trips
			AmpHrsChrgdARC:	8 fail counts out of 10 sample counts	All the following conditions are met for	>= 3,000 milliseconds		
			AmpHrsDischrgdARC:	8 fail counts out of 10 sample counts	Partial Network is active			
			BatCrnkDatARC:	8 fail counts out of 10 sample counts	Power Mode	= Run		
					Battery Voltage	>11.00 Volts		
			BatLINOffDatARC:	8 fail counts out of 10 sample counts				
			BatStsDatARC:	8 fail counts out of 10 sample counts				
			CfgWkupDatARC:	8 fail counts out of 10 sample counts				
			IBSCurrOORAndRatIFOM ARC:	8 fail counts out of 10 sample counts				
			IBSDiagDetARC:	8 fail counts out of 10 sample counts				
			MsrdTempARC:	8 fail counts out of 10 sample counts				
			MinCrnkgDatARC:	8 fail counts out of 10 sample counts				
			MVIAndSOFDatARC:	8 fail counts out of 10 sample counts				
			BatSOCDatARC:	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.
			IBSVItgFOMARC:	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 upto 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 upto 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	> 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 Circuit High Diagnostic Enable is **TRUE**	= TRUE		
					Temperature Circuit 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 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	NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_TECH_AGM	threshold	> 11.00 volts (with hysteresis disable < 10.00)		
			Battery Nominal Return C20 is above threshold	>5.00	IBS NormalCommEnable is TRUE	= TRUE		
			IBS Config Return Battery Cal #1 U40% is above threshold	>0.50	IBS Configuration Diagnostic Historical Enable is TRUE	= TRUE		
			IBS Config Return Battery Cal #2 U80% is above threshold	>0.50	No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
			If SOC Bounding Limit Configuration check is TRUE then following conditions are included	= TRUE	No Active Battery Sensor Signal Message Counter Incorrect DTC	= P15FF00		
			SOC Bounding Limit Hr8 Difference is above the threshold	>0.01				
			SOC Bounding Limit Hr8 Difference is above the threshold	>0.01				
			SOC Bounding Limit Hr24 Difference is above threshold	>0.01				

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 on 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 Communication 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: 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 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: 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 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: 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.
			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: 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 C, 1 Trip No MIL Emissions Neutral "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				
			EHCCI_ARC:	8 fail counts out of 10 sample counts				
			EHCCI_CS:	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: VSANDP_ARC: VSANDP_MAC:	18 sample counts 14 fail counts out of 18 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	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				
			HVACFCRADSF_CS:	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				
			HVACFCRDP_CS:	14 fail counts out of 18samole counts				

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

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	>= 5,000 milliseconds	Executes in 10ms loop.	Type C, 1 Trip No MIL Emissions Neutral "Emissions Neutral Diagnostic - Type C"
					All the following conditions are met for	>= 3,000 milliseconds		
			HVACICR1_ARC:	8 fail counts out of 10 sample counts	Partial Network is active			
					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	CbFALSE (CbTRUE indicates enabled)		
					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 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 $415 Message $417 Message $4B5 Message $028	 >10,625.00 milliseconds >10,625.00 milliseconds >12,500.00 milliseconds >10,025.00 milliseconds >10,250.00 milliseconds >12,500.00 milliseconds >12,500.00 milliseconds >10,025.00 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 $214	>10,625.00 milliseconds	If power mode = Run/Propulsion/Start:			
			Message $4BD	>12,500.00 milliseconds	Power Mode is run			
			Message $254	>10,625.00 milliseconds	If power mode = Accessory:			
			Message $4E8	>12,500.00 milliseconds	Off key cycle diagnostics are enabled Or Controller is an OBD controller	CbFALSE (CbTRUE indicates enabled)		
					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.

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	Vehicle Power Mode FOR Any participating Partial Network Control module operational software	= Propulsion >= 5 sec = 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 Any participating Partial Network FOR	> k_Battery Voltage Low Threshold = 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 Any participating Partial Network FOR	> k_Battery Voltage Low Threshold = 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 Any participating Partial Network FOR	> k_Battery Voltage Low Threshold = 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 Any participating Partial Network FOR	> k_Battery Voltage Low Threshold = 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 < k_Battery Voltage High Threshold = 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 EBCM on CAN 1 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 < k_Battery Voltage High Threshold = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the EBCM on CAN 2 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 < k_Battery Voltage High Threshold = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the ECM Detected on CAN 2	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 < k_Battery Voltage High Threshold = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
Loss of Communication with the ECM Detected on CAN 3	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 < k_Battery Voltage High Threshold = 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 < k_Battery Voltage High Threshold = Active >= k_Lost Communication Power Mode Time	6.5 [sec]	Type B 2 Trips
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 < k_Battery Voltage High Threshold = 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 < k_Battery Voltage High Threshold = 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 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 < k_Battery Voltage High Threshold = 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 < k_Battery Voltage High Threshold = 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 < k_Battery Voltage High Threshold = Active >= kJ nvalid Data Received from BCM Power Mode Time	0.75 [sec] min 1.5 [sec] max	Type B 2 Trips
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 < k_Battery Voltage High Threshold = 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 < k_Battery Voltage High Threshold = Active >= 5 seconds	150 [msec] min 5.0 [sec] max (startup)	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 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-l 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 < k_Battery Voltage High Threshold = 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 Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.2s Failure out of 20 samples Time basis = 0.01s	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.2s Failure out of 20 samples Time basis = 0.01s	Type A, ITrip
Engine Diagnostic Status Signals Message Counter Incorrect	P10C6	The diagnostic monitor detects an alive rolling count error or checksum error in any of the CAN frames $297,$2A0, $453, $58F, $2A6, and $531 sent by ECM that is received by Reductant Control Module (DEFC).	If the frames counter value increments in the order (0->I->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		Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2s Failure out of 10 to 200 samples (depending on the CAN Frame IDs transmit rate) Time basis = 0.01s	Type A, ITrip
			if any of the frames checksum	# computed checksum				
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 Notel: 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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 > 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 & U2212 & U1009 & U2211 &U2213 & U1368&U1369 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, ITrip
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	Reductant Control Module internal error flag for the corosponding failure Notel: Error flag determination is based on the AUTOSAR Standard Utility Modules Specifications & Architecture, implemented with GM XoutY fault maturation strategy. It compares hardware information to the CAN status from different controllers.	= True	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	Up to 0.2s 16 failures out of 20 samples O.Ols/sample	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Reductant Control Module internal error flag for the corosponding failure Notel: Error flag determination is based on the AUTOSAR Standard Utility Modules Specifications & Architecture, implemented with GM XoutY fault maturation strategy. It compares hardware information to the CAN status from different controllers.	= TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	Upto 0.2s 16 failures out of 20 samples O.Ols/sample	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) Propulstion System Active Time after controller initialization Engine cranking (received 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 > 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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) Propulstion System Active Time after controller initialization Engine cranking (received 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 > 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 Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 > 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 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 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, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion)	= ACTIVE	No debounce applied Once at ECU initialization	Type A, ITrip
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	< 4.75V	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip
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	> 5.25V	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Heater	P143C	This monitoring checks if at least one	Heater driver hardware protection has		Vehicle Power Mode	= ACTIVE	Upto 1.2 s	Type A,
3 Control Circuit		heater high side and low side are shorted	shut off heaters due to the following		(Accessory, Run, Start Request or Proplusion)		Failure out of 4 samples	1 Trip
Shorted		together. The 3 reductant heaters (2 tank	conditions:		Heater power supply voltage	> 5.7V	Success out of 12 samples	
		heaters, and 1 supply line heater) share a	[Low side FET drain	>0.45 V			Time basis = 0.2s	
		low side driver, and therefore cannot	OR		Proplusion System	= ACTIVE	Recovery only at next driving	
		pinpoint which heater is faulted.	load current]	>95 A			cycle	
		While heaters are commanded off,	AND		[Heater 1 PWM Command	>0%		
		shorted high side to low side faults are	Error Counter	>4	OR		Note: The **Error counter** is	
		indistinguishable to an unfaulted heater.			Heater 2 PWM Command	>0%	incremented by 6 each time the	
		Upon the presence of certain heater	<u>Note1:</u> The control system will determine		OR		heater is turned off and back on,	
		circuit faults, the heater driver hardware	that other circuit faults are not detected,		Heater 3 PWM Command]	>0%	but decremented by 1 each time	
		will enter a self-protection mode and will	and the heaters will be commanded back				loop that the heater is on.	
		shut off automatically. Other heater	on when the following criteria are met:		No DCU internal fault	P20FF & P10F4		
		circuit diagnostics can be diagnosed while	ADC voltage on high side	< 0.909V	<u>Note:</u> Heaters PWM command is set to zero in			
		the heaters are off. If no fault is	AND		response to a fault on the:			
		confirmed after sufficient time with the	ADC voltage high side	> 0.767V	Tank temperature sensor	P205B & P205C & P205D & P205E		
		heaters off, the heaters are commanded	AND		Tank temperature power supply	P131B & P131C		
		back on. A shorted high side to low side	ADC voltage low side	< 0.613V	Heater 1	P214F & P21DD & P20BB & P20BC & P20B9 &		
		fault is confirmed after the heaters have	AND			P20BA & P10D9		
		automatically shut off via hardware	ADC voltage low side	> 0.487V	Heater 2	P221C & P221D & P20C0 & P20BE & P20BF &		
		protection sufficient times without				P20BD & P10F3		
		confirming the presence of any other	<u>Note2:</u> A fault is confirmed when the Error		Heater 3	P221E & P221F & P20C1 & P20C2 & P20C3 &		
		circuit faults.	Counter (based on number of heater			P20C4		
			transitions between the on and off states)		Heater power supply	P10DC & P10DD		
			exceeds the Error counter threshold.		CAN communication	P10C6 & U2212 & U1009 & U2211 & U2213 &		
						U1368&U1369		
					Hardwired Run/Crank	P10DA & P10DB		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	<0.230	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 = Heating > OA P204B & P204C & P204D & P204E P249C & P208B & P20E8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A P10CA & P10C9 P10C6 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 P10DA & P10DB P20FF & P10F4	8s Failure out of 800 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip
		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	>0.80				
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 Propulsion System Off Time Don't Use Data Propulsion System Off Time Invalid No Level Sensor voltage fault No SENT communication fault No DCU internal fault Note: See **"Level & Quality Performance"** sheet for parameter definitions	= ACTIVE > 300s >5L > 0°C & < 70°C >3°C = 0% = 0% = FALSE = TRUE > 2km/h = FALSE = FALSE P203C & P203D U2627 & U2628 & U2630 P20FF&P10F4	Upto 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 Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No SENT Communication Fault No DCU internal fault	= 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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No SENT Communication Fault No DCU internal fault	= 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 > ls	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 = Startup P204C & P204D P20FF & P10F4	Up to 33 s (3xls 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, l 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 > ls				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 <u>Note:</u> Pressure variable is saturated to -50kPa for 0.35V < Voltages < 0.5V. Additionally, pressure variable is set to OkPA for Voltages < 0.35V.	< 0.45V (-50 kPa)	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.1 s 6 failures out of 100 samples O.Ols/sample	Type A, ITrip
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 <u>Note:</u> Pressure variable is saturated to 900kPa for 4.5V < Voltages < 4.75V. Additionally, pressure variable is set to OkPA for Voltages > 4.75V.	> 4.90V (0 kPa)	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.1s 6 failures out of 100 samples O.Ols/sample	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 on a moving window of measurements is greater than expected.	If pump control mode = forward Pressure string length OR If pump control mode = stop Pressure string length OR If pump control mode = heating Pressure string length OR If pump control mode is in reverse Pressure string length The moving window length is <u>Notel:</u> String length is computed as summation of all pressure absolute variation within a moving window. <u>Note2:</u> The string length is reseted when switching pump modes (forward, reverse, stop). <u>Note3:</u> To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	 > 1500 kPa/Moving Window > 1000 kPa/Moving Window > 1000 kPa/Moving Window > 200 kPa/Moving Window = 100 samples (O.Ols/sample)	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) Time after controller initialization No Pressure Sensor fault No DCU internal fault	= ACTIVE > 0.510s P204C & P204D P20FF & P10F4	0.1 s 10 failures out of 100 samples O.Ols/sample	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) **[Average engine startup reference temperature mask** AND **[Average engine startup reference temperature]** 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 Notel: **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**	= ACTIVE = "Use Data" > -10°C > ls < 3.5 s P205C & P205D & P2O5E U1009 & U2212 & P10C6 & U2211 & U2213 & U1368&U1369 P21CB P20FF & P10F4 > 8hrs = Valid	0.3 s Failure out of 3 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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)	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type A, ITrip
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)	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.5 s Failure out of 50 samples Time basis = 0.01s	Type A, ITrip
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 on a moving window of measurements is greater than expected.	Tank temperature string length The moving window length is Notel; String length is computed as summation of all temperature absolute variation within a moving window.	> 4°C / Moving Window = 10 samples (O.ls/sample)	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No Temperature Sensor fault No DCU internal fault	= ACTIVE P205C & P205D P20FF & P10F4	0.3 s 3 failures out of 9 samples O.ls/sample	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vertical Power Mode (Accessory, Run, Start Request or Proplusion) 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 Propulsion System Off Time Don't Use Data Propulsion System Off Time Invalid No Level Sensor voltage fault No SENT communication fault No DCU internal fault Note: See **"Level & Quality Performance"** sheet for parameter definitions	= ACTIVE > 300s >5L > 0°C & < 70°C >3°C = 0% = 0% = FALSE = TRUE > 2km/h = FALSE = FALSE P206C & P206D U2627 & U2628 & U2630 P20FF and P10F4	60s Failure out of 600 samples Success out of 40 samples Time basis = 0.1s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No SENT Communication Fault No DCU internal fault	= ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No SENT Communication Fault No DCU internal fault	= ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 = 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 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 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, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.4 s Failure out of 40 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
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	< 1.00	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 >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 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 P10DA & P10DB	8 s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
			(Reductant heater 1 high side voltage - Reductant heater 1 low side voltage) / Reductant heater 1 current OR	> 1.80				
			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				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
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.	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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
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.	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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	<2.80	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 >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 & U2212 & U1009 & U2211 & U2213 & U1368 &U1369 P10DA & P10DB	8s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
			(Reductant heater 2 high side voltage - Reductant heater 2 low side voltage) / Reductant heater 2 current OR	> 7.50				
			Reductant heater 2 power command - Reductant heater 2 power OR	> 16.5W			10 s Failure out of 100 samples Time basis = 0.1s Recovery only at next driving cycle	
			Reductant heater 2 power - Reductant heater 2 power command	> 16.5W				
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.	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 = OV	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, 1 Trip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2s 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 Ilium.
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.	<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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
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	< 1.5Q	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) Reductant heater 3 PWM command No DCU internal fault <u>Note:</u> 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 >0% P20FF & P10F4 P205B & P205C & P205D & P205E P131B & P131C P214F & P20BA & P20BB & P20BC & P20B9 & P21DD & P10D9 P20BE & P221D & P20C0 & P20BF & P20BD & P221C & P10F3 P221E & P221F & P20C1 & P20C3 & P20C4 & P143C P10DC & P10DD P10C6 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 P10DA & P10DB	8s Failure out of 80 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
			(Reductant heater 3 high side voltage - Reductant heater 3 low side voltage) / Reductant heater 3 current OR	>2.60				
			Reductant heater 3 power command - Reductant heater 3 power OR	> 29W			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				
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 = OV	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	2 s Failure out of 10 samples Time basis = 0.2s Recovery only at next driving cycle	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) Pump state DEF Level Estimation No DCU internal fault <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: No Pressure Sensor fault No Reductant Pump fault No Pressure Sensor power supply fault No CAN communication fault Hardwired Run/Crank <u>Note2:</u> To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	= 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 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 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, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion)	= ACTIVE	4s Failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, 1Trip
					Pump state	= Buildup, OR = Closed Loop Control, OR = Reductant Delivery Performance		
					Engine Auto Stop Active	= False		
					DEF Level Estimation	>3L		
					No DCU internal fault	P20FF & P10F4		
					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	P204B & P204C & P204D & P204E		
					No Reductant Pump fault	P208B & P149F & P2OE9& P2C11 & P214E & P208D & P208C & P208A & P249C		
					No Pressure Sensor power supply fault	P10CA & P10C9		
					No CAN communication fault	P10C6 & U2212 & U1009 & U2211 & U2213 U1368&U1369		
					Hardwired Run/Crank	P10DA & P10DB		
					Note2: To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 I'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		Vehicle Power Mode (Accessory, Run, Start Request or Proplusion)	= ACTIVE	No debounce applied Once at initialization	Type A, ITrip
		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				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= 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, I Trip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	4 s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, I 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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) Vehicle speed *(see notel)* 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 <u>Notel:</u> Vehicle speed shall be FALSE for 2 consecutive samples to disable this condition. <u>Note2:</u> 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. <u>Note3:</u> See "Level & Quality Performance" sheet for parameters definition	= ACTIVE > 5 km/h = TRUE > 0.1 m/s² = Liquid = TRUE > 5L P203B & P203C & P203D & P131B & P131C P205B & P205C & P205D & P205E P10C6 & U2212 & U1009 & U2211 & U2213 & U1368 & U1369 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 <u>Note4:</u> Long. acc. is computed internally in Reductant Control Module from vehicle speed derivation.	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) Engine Cranking (serial data) Engine Controller Sensed Powertrain Relay Voltage Mask No DCU internal fault	= Active = False = True P20FF&P10F4	3s Failure out of 300 samples Time basis = 0.01s	Type B, 2 Trips
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 >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 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 P10DA & P10DB	4s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1Trip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 >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 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 P10DA & P10DB	4s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, 1Trip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	4s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) 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 >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 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 P10DA & P10DB	4s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	4s Failure out of 40 samples Time basis = 0.1s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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.	**Pressure Closed Loop Control**	# ACTIVE	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion)	= ACTIVE	75 s (3x15s timeout + 2x15s wait) Malfunction criteria confirmation out of 1500 samples Time basis = 0.01s	Type A, 1Trip
			AND					
			[Total time from the start of line filling	> 15s	Pump state	= WaitAuthorization, OR = Priming, OR = Buildup, OR = Closed Loop Control		
			OR					
		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.	Total time from the exit of Start & Stop]	> 7.5s			Failure confirmation after **two retries.**	
			Note: See **"Repeat Defrost"** section for Pressure hold definition		**Estimated DEF Level**	>3L	Between two retries, pump is stopped for 15s.	
					No DCU internal fault	P20FF & P10F4	Success is reported as soon as 'Pressure Closed Loop Control' is active.	
					Note1: Pump is force to stop if:			
					Pressure Sensor fault	P204B & P204C & P204D & P204E		
					Reductant Pump fault	P149F & P208B & P2OE8 & P20E9 & P2C11 & P214E & P208D & P208C & P208A	Recovery only at next driving cycle	
					Pressure Sensor power supply fault	P10CA & P10C9		
					CAN communication fault	P10C6 & U2212 & U1009 & U2211 & U2213 & U1368&U1369	Note: See **"Repeat Defrost"** sheet for retries definition	
					Hardwired Run/Crank	P10DA & P10DB		
					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.			

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 elapsed. At this time, all the temperature sensors are expected to be stabilized.	Reductant secondary device temperature information - reductant tank temperature sensor OR	>21°C	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) **[(Average engine startup reference temperature mask** OR Service Tamper Bay test request) AND Reductant Tank Temperature Sensor A 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 <u>Notel:</u> **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) <u>Note2:The</u> 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 = "Use Data" > -29°C > ls < 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, l Trip
			Reductant tank temperature sensor - reductant secondary device temperature information	>21°C				

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No SENT communication fault No DCU internal fault	= ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5ms	Type A, ITrip
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No SENT communication fault No DCU internal fault	= ACTIVE U2627 & U2628 & U2630 P20FF & P10F4	2 s Failure out of 4 samples Time basis = 0.5s	Type A, ITrip
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 on a moving window of measurementsis greater than expected.	Reductant UTLC Secondary temperature string length The moving window length is Note1: String length is computed as summation of all temperature absolute variation within a moving window.	> 6°C/Moving Window 14 samples (1.3s/sample)	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No UTLC temperature sensor circuit fault No SENT communication fault No DCU internal fault	= ACTIVE P2ADB & P2ADC U2627 & U2628 & U2630 P20FF & P10F4	1.3 s 1 failures out of 3 samples 1.3s/sample	Type A, ITrip
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.	If Pump Mode = Heating: Reducant pump motor current Elseif (Pump State = Priming OR Run): Reducant pump motor current	 < 0.75A < 0.5A	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) Pump State Reductant Pressure Sensor Measurement Pump hardware protection 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 No DCU internal fault Note2: To obtain clear understanding of various pump states & transitions, refer to the **"Pump States & Transitions"** sheet.	= 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 & U2212 & U1009 & U2211 & U2213 & U1368&U1369 P10DA & P10DB P20FF & P10F4	4 s Failure out of 400 samples Time basis = 0.01s Recovery only at next driving cycle	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Exhaust Fluid Control Module Received Invalid Data from Central Gateway Module	U1368	The diagnostic monitor detects an alive rolling count error or checksum error in the frames sent by CGM that is received by Reductant Control Module (DEFC).	If the frames counter value increments in the order (0->l->2->3->0->...), with wrap-around after 3, then the diagnostic reports **pass.** If any value is not in the order listed, then the diagnostic reports **fail.**		Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 20 samples Time basis = 0.25s.	Type B, 2 Trips
			if the Message Frame ID $20D checksum	# computed cheksum				
Diesel Exhaust Fluid Control Module Received Invalid Data from Body Control Module	U1369	The diagnostic monitor detects an alive rolling count error or checksum error in the frames $284 and $274 sent by BCM that is received by Reductant Control Module (DEFC).	If the frames counter value increments in the order (0->l->2->3->0->...), with wrap-around after 3, then the diagnostic reports **pass.** If any value is not in the order listed, then the diagnostic reports **fail.**		Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 20 samples Time basis = 0.25s.	Type B, 2 Trips
			if any of the frames checksum	# computed cheksum				
Reductant Control Module CAN Bus 3 Off	U1009	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	CAN bus transmitter transmission errors count Note: The BusOff state is defined by the CAN controller hardware per ISO 11898	>255	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.09s Failure out of 9 samples Time basis = 0.01s	Type A, ITrip
Reductant Control Module Lost Communication with Body Control Module	U2211	This DTC monitors for a loss of communication with Body Control Module	Reductant Control Module has not received CAN Message from Body Control Module for: Message Frame ID $284 OR Message Frame ID $274	 > 0.26s > 0.110s	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 20 to 50 samples (depending on the CAN Frame IDs transmit rate) Time basis = 0.10s to 0.25s	Type B, 2 Trips
Reductant Control Module Lost Communication with Engine Control Module	U2212	This DTC monitors for a loss of communication with Engine Control Module	Reductant Control Module has not received CAN Message from Engine Control Module for: Message Frame ID $297 OR Message Frame ID $2A0 OR Message Frame ID $453 OR Message Frame ID $58F OR Message Frame ID $2A6 OR Message Frame ID $531	 > 0.110s > 0.060s > 1.010s > 1.010s > 0.110s > 0.110s	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 10 to 200 samples (depending on the CAN Frame IDs transmit rate) Time basis = 0.05s to Is (depending on the CAN Frame IDs transmit rate)	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Control Module Lost Communication with Central Gateway Module	U2213	This DTC monitors for a loss of communication with Central Gateway Module	Reductant Control Module has not received CAN Message from Central Gateway Module for: Message Frame ID $20D	 > 0.26s	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	5s Failure out of 20 samples Time basis = 0.25s.	Type B, 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	< 42 clock ticks > 70 clock ticks >15 <0 +/- 1/64 TRUE TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, ITrip
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	< 42 clock ticks > 70 clock ticks >15 <0 +/- 1/64 TRUE TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, ITrip
Reductant Control Module Lost Communication with Reductant TankTemperature 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	< 42 clock ticks > 70 clock ticks >15 <0 +/- 1/64 TRUE TRUE	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion) No DCU internal fault	= ACTIVE P20FF & P10F4	0.42 s Failure out of 14 samples Time basis = 0.03s	Type A, ITrip

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Vehicle Power Mode (Accessory, Run, Start Request or Proplusion)	=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	>5 L		
					[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 & U2212 & U1009 & U2211 & U2213 & [illegible]		

Monitor/System	Input Out-of-Range High	Input Out-of-Range Low	Input Open Circuit	Input Rationality Low	Input Rationality High	Input Other Rationality	Digital Input Communication Loss/Errors	Output Functional	Output Shorted High	Output Shorted Low	Output Open Circuit	Digital Output Communication Loss/Errors
Wheel Speed Sensor-FL	C0501 C0503	C0501 C0502	C0502	CO505	C0504	C0501 C0504 C0505 C0555 C10EE P0606 C2A01 C003F						
Wheel Speed Sensor-FR	C0507 C0509	C0507 C0508	C0508	C050B	C050A	C0507 C050A C050B C0556 C10EE P0606 C2A02 C003F						
Wheel Speed Sensor-RL	C050D C050F	C050D C050E	C050E	C0511	C0510	C050D C0510 C0511 C0557 C10EE P0606 C2A03 C003F						
Wheel Speed Sensor-RR	C0513 C0515	C0513 C0514	C0514	C0517	C0516	C0513 C0516 C0517 C0558 C10EE P0606 C2A04 C003F						
Wheel Speed Sensor Supply									C05A3			
Master Cylinder Pressure Sensor	C0572	C0571				C0560 C0574						
Brake Pressure Sensor	C053F	C053E				C053D						
Pedal Travel Sensor	C05CC C05CF	C05CC C05CF		C05CC C05CF C05D3	C05CC C05CF C05D2	C05CC C05CF C05D0 C05D4 C2A13 C2A14						
Motor Position Sensor						C058A C058E C0596 C2A1A C2A1C						
Motor Position Sensor Supply	C05D1 C05BB	C05D1 C05BB				C05D1 C05BB						
Brake Booster System						C0021 C05B0 C15C7 P0562						
Left Front Outlet Valve Control								C0011	C0011	C0011	C0011	
Right Front Outlet Valve Control								C0015	C0015	C0015	C0015	
Left Rear Outlet Valve Control								C0019	C0019	C0019	C0019	
Right Rear Outlet Valve Control								C001D	C001D	C001D	C001D	
Left Front Inlet Valve Control								C0010	C0010	C0010	C0010	
Right Front Inlet Valve Control								C0014	C0014	C0014	C0014	
Left Rear Inlet Valve Control								C0018	C0018	C0018	C0018	
Right Rear Inlet Valve Control								C001C	C001C	C001C	C001C	
Brake Pressure Build Valve 1								C0002	C0002	C0002	C0002	
Brake Pressure Build Valve 2								C0004	C0004	C0004	C0004	

Monitor/System	Input Out-of-Range High	Input Out-of-Range Low	Input Open Circuit	Input Rationality Low	Input Rationality High	Input Other Rationality	Digital Input Communication Loss/Errors	Output Functional	Output Shorted High	Output Shorted Low	Output Open Circuit	Digital Output Communication Loss/Errors
Master Cylinder Isolation Valve 1								C0001	C0001	C0001	C0001	
Master Cylinder Isolation Valve 2								C0003	C0003	C0003	C0003	
Brake Pedal Feedback Pressure Valve (Simulator)								C0024	C0024	C0024	C0024	
Brake Master Cylinder Cut Off Valve								C05D5	C05D5	C05D5	C05D5	
ABS Valve Solenoids Supply	C053B		C053B									
Brake Booster Internal Power Driver Supply	C0595		C0595									
Power Supply	P0563 U3006 U3007	U3006 U3007	U3006 U3007	P2534	P2535	P0606						
CAN Bus HS							U0073 U1608 U0402 U0140 U1611 U0401 U0422 U0101	U1960 U1961				U0073
CAN Bus CE							U0074	U1960 U1961				U0074
IBC Motor								C0582 C0590 C0594 C05C2	C057F	C0580	C0591	
Controller						C0616 P0602 P0604 P0606 P060B P062F U3000						

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	P0016	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.
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 FuelPumpRIyCktFA FHP_MU_ZeroDeliveryFit FHP_PR_FullDischargeFIt	>= 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)** -> AGGIUNGERE CHE CI SONO DUE MAPPEA CUI FAR RIFERIMENTO IN FUNZIONE DEL FATTO CHE SIAMO 0 MENO IN EXTENDED AREA. KtFHPD_p_MU_MaxRailPresThrshs & ...ext	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 Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	/failures out of 14 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	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 Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	/failures out of 14 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	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 Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	/failures out of 14 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	Type A, 1 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 - LZO)	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 sensorthat is equal to: RadiatorCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoIlseAssgnmnt Temperature Sensor 5: CeEECR_e_NoIlseAssgnmnt Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number.		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: - BiasChkCylHdClntSnsr - BiasChkBlockClntSnsr - BiasChkEngInClntSnsr - BiasChkEngOutClntSnsr - BiasChkHtrCrInClntSnsr - BiasChkHtrCrOutClnSnsr - BiasChkRadOutClntSnsr - BiasChkBypInClntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk-EGRJJpStmnSnsr - BiasChk_EGR_DwnStmSnsr -	 OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_RadiatorOutlet_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_EngineInlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCore1nlet_CktFA EECR_HeaterCoreOutlet_CktFA EECR_RadiatorOutlet_CktFA EECR_BypassInlet_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.
			Engine Outlet: CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng InCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng MetalSnsr Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkEng MetalSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OutCIntSnsr Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrOutCInSnsr Comparison sensor 2: CeEECR_e_BiasChkEng InCIntSnsr Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A:	39.00 °C 6.20 °C 33.00 °C 7.50 °C 20.00 °C 7.38 °C	BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr Comparison sensors ================== The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** 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 ================= Comparison sensor 1 & 2 are not	EGRTempSensorDNSS_F A 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 = CeEECR_e_BiasChkNoS election		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrInCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckCIntSnsr		================= Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs	Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA		
			Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A: Threshold B:	20.00 °C 7.61 °C	At power-up a warm sensor and cool sensor are compared			
			Radiator Outlet: CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEng OutCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkOut sideAirSnsr		Warm sensor Cool sensor	CeAEHR_e_BlkHtrEngIn CIntSnsr CeAEHR_e_BlkHtrRadO utCIntSnsr >7.40 °C		
			Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A: Threshold B:	21.00 °C 10.68 °C	If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature	>28,800 seconds >28,800 seconds >-20.00 °C		
			A failure will be reported if any of the following conditions are met. Evaluated in order:	>A °C	There are 4 different types of aux heater detection for this application:			
			1) This sensor is above both comparison sensors	>A °C	2x2 signature Absolute Drop IAT Drop Temperature Derivative	Enabled Enabled Disabled Disabled		
			2) This sensor is below both comparison					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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	>B°C >B°C	**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	CeAEHR_e_BlkHtrEngInClntSnsr CeAEHR_e_BlkHtrEngMetalSnsr CeAEHR_e_BlkHtrRadOutClntSnsr CeAEHR_e_BlkHtrIntakeAirSnsr 6.0°C 5.0°C >15.0 °C CeAEHR_e_BlkHtrBlockClntSnsr >87.00 L/min 0.1 - 17.0 seconds <77.0 seconds >1.8 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A block heater is detected if a drop is	CeAEHR_e_BlkHtrIntake AirSnsr		
					IAT Drop Criteria: The sensor will be used as IAT for this method			
					A block heater will be detected if:	>5.0°C		
					IAT has a drop of during a drive defined by: Drive time Vehicle speed	>400.0 seconds >24.0kph		
					Addtional drive time is provided when vehicle speed drops below above threshold as follows	0.5times the seconds with vehicle speed below the threshold above		
						> 180.0 seconds		
					This detection method will abort if the engine is off OR Engine runtime	> 1,800 seconds		
					Temperature Derivative Criteria:	CeAEHR_e_BlkHtrBlock ClntSnsr		
					Derivative will be monitored using	>-1.00L/min		
					Derivative will be monitored once coolant flow is AND Flow time is between AND either Engine runtime is OR	5.0- 15.0 seconds < 75.0 seconds <-0.10°C/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Insufficent coolant flow is present for Derivative count will increment if derivative is If counts are a block heater is detected =================	> 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 - LZO)	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 sensorthat is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr	< X Ohms X is equal to: Temp Sensor 1: 48 Ohms Temp Sensor 2: 48.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 8: 9.0 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.
Radiator Coolant Temp Sensor Circuit High Voltage (Diesel L6 ATM - LZO)	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 sensorthat is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr	> X Ohms X is equal to: Temp Sensor 1: 235,000 Ohms Temp Sensor 2: 235,000 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 8: 364,600 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.
Radiator Coolant Temperature Sensor Circuit Intermittent/ Erratic (Diesel L6 ATM - LZO)	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 sensorthat is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt		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 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 Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading	 5.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C 7.4 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.
			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 caluculated 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. *****************************					

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)	P00C7	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 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.	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, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: 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] < 985.00 [rpm] < 25.00 [mm^3] > 90.00 [%] > 60.00 [°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 ECT_Sensor_FA	240.00 fail counters over 300.00 sample counters 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.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor	> 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] <= 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa] <= 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 TCIAP Pressure TCIAP Pressure No Active DTCs: No Pending DTCs:	>5.0 [s] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] >= 50.0 [kPa] <= 115.0 [kPa] EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 fail counters over 5 sample counters 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.
			AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor OR Difference (absolute value) in measured pressure between MAP sensor and BARO sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and MAP sensor AND Difference (absolute value) in measured pressure between TCIAP sensor and BARO sensor	<= 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] > 10.0 [kPa]				

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 Fuel Metering Unit valve and the controller ground < 0.5 Q	Powertrain relay voltage Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	7.00 failures out of 14.00 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	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 Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	7.00 failures out of 14.00 samples 100 ms/sample if actuator is a Digital Inlet Valve, or 6.25 ms/sample if actuator is a Suction Control Valve	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 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.		Test enabled by calibration	1.00==TRUE	The averaged temperatures are calculated over 10.00 samples.	Type B, 2 Trips
					Key on and engine not running or engine running for less than a calibratable time	< 2.00 [s]	No debounce is present: DTC sets as soon as the error is present	
					Engine not cranking	==TRUE		
			Temperature difference (absolute value)	> 20.00 [°C]				
					Runk Crank Relay voltage in range	>11.00 [V]	Function task: at key on	
					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 CAC inlet gas temperature and CAC outlet gas temperature smaller than a calibratable threshold	< 45.00 [°C]		
					Sensor Performance Check not yet completed in current driving cycle	==TRUE		

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.
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 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, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: 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] < 985.00 [rpm] < 25.00 [mm^3] > 90.00 [%] > 60.00 [°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 ECT_Sensor_FA	480.00 fail counters over 600.00 sample counters 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.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			MAP sensor OR MAP sensor OR 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	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	>5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 sample counters 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.
Engine Coolant Temperature Sensor Performance (Diesel L6 ATM - LZO)	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 sensorthat is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoIlseAssg nmnt Temperature Sensor 5: CeEECR_e_NoIlseAssg nmnt Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number.		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: - BiasChkCylHdClntSnsr - BiasChkBlockClntSnsr - BiasChkEngInClntSnsr - BiasChkEngOutClntSnsr - BiasChkHtrCrInClntSnsr - BiasChkHtrCrOutClnSnsr - BiasChkRadOutClntSnsr - BiasChkBypInClntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk-EGRJJpStmnSn	 OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_EngineOutlet_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_EngineInlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCore1nlet_CktFA EECR_HeaterCoreOutlet_CktFA EECR_RadiatorOutlet_CktFA EECR_BypassInlet_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.
			Engine Outlet:		sr	EGRTempSensorUPSS_F		
			CeEECR_e_PhysSnsr2		-	A		
			Comparison sensor 1:		BiasChk_EGR_DwnStmS			
			CeEECR_e_BiasChkEng		nsr	EGRTempSensorDNSS_F		
			InCIntSnsr		-	A		
			Comparison sensor 2:		BiasChk_EGR_LowPrsSn			
			CeEECR_e_BiasChkEng		sr	LPE_TempSnsrFA		
			MetalSnsr		- BiasChkFuelSnsr	HRTR_b_FuelSensor_FA		
			Block Heater:			_Bndl		
			CeEECR_e_AuxHeaterBi					
			asLow	39.00 °C				
			Threshold A:	6.20 °C				
			Threshold B:		Comparison sensors	= Availible		
			Engine Inlet:		==================			
			CeEECR_e_PhysSnsr1					
			Comparison sensor 1:		The following thresholds			
			CeEECR_e_BiasChkEng		are based on the sensor			
			MetalSnsr		under diagnosis			
			Comparison sensor 2:					
			CeEECR_e_BiasChkEng		**Engine Outlet:**			
			OutCIntSnsr		Propulsion Off Soak Time	> 21,600 seconds		
			Block Heater:		Ambient Air Temperature	>-20.0 °C		
			CeEECR_e_AuxHeaterBi					
			asHigh	33.00 °C	**Engine Inlet:**			
			Threshold A:	7.50 °C	Propulsion Off Soak Time	>21,600 seconds		
			Threshold B:		Ambient Air Temperature	>-20.0 °C		
			Heater Inlet:		**Heater Inlet:**			
			CeEECR_e_NoPhysAss		Propulsion Off Soak Time	>21,600 seconds		
			gnmnt		Ambient Air Temperature	>-20.0 °C		
			Comparison sensor 1:					
			CeEECR_e_BiasChkHtr		**Heater Outlet:**			
			CrOutCInSnsr		Propulsion Off Soak Time	>21,600 seconds		
			Comparison sensor 2:		Ambient Air Temperature	>-20.0 °C		
			CeEECR_e_BiasChkEng					
			InCIntSnsr		**Radiator Outlet:**			
			Block Heater:		Propulsion Off Soak Time	>21,600 seconds		
			CeEECR_e_AuxHeaterN		Ambient Air Temperature	>-20.0 °C		
			oEffect	20.00 °C				
			Threshold A:	7.38 °C	=================			
			Threshold B:					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Comparison sensor 1 & 2			
			Heater Outlet:		are not	=		
			CeEECR_e_NoPhysAss			CeEECR_e_BiasChkNoS		
			gnmnt			election		
			Comparison sensor 1:		=================			
			CeEECR_e_BiasChkHtr		Aux Heat Detection			
			CrInCIntSnsr					
			Comparison sensor 2:		Aux heat detection can			
			CeEECR_e_BiasChkBlo		only be enabled the			
			ckCIntSnsr		following are met:			
			Block Heater:					
			CeEECR_e_AuxHeaterN		No Active DTCs	Same set as listed above		
			oEffect	20.00 °C		and		
			Threshold A:	7.61 °C		EngineModeNotRunTimer		
			Threshold B:			Error		
						EngineModeNotRunTimer		
			Radiator Outlet:			_FA		
			CeEECR_e_PhysSnsr3			VehicleSpeedSensor_FA		
			Comparison sensor 1:					
			CeEECR_e_BiasChkEng		At power-up a warm			
			OutCIntSnsr		sensor and cool sensor			
			Comparison sensor 2:		are compared			
			CeEECR_e_BiasChkOut					
			sideAirSnsr		Warm sensor	CeAEHR_e_BlkHtrEngIn		
			Block Heater:			CIntSnsr		
			CeEECR_e_AuxHeaterN		Cool sensor	CeAEHR_e_BlkHtrRadO		
			oEffect	21.00 °C		utCIntSnsr		
			Threshold A:	10.68 °C				
			Threshold B:		If the warm sensor is	>7.40 °C		
					compared to the cool			
			A failure will be reported if		sensor			
			any of the following					
			conditions are met.		Propulsion Off Soak Time	>28,800 seconds		
			Evaluated in order:		Engine Off Soak Time	>28,800 seconds		
				>A °C	Ambient Air Temperature	>-20.00 °C		
			1) This sensor is					
			above both comparison		There are 4 different			
			sensors		types of aux heater			
				>A °C	detection for this			
			2) This sensor is		application:			
			below both comparison					
			sensors		2x2 signature	Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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	>B°C >B°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 Insufficent coolant flow is present for	Enabled Disabled Disabled CeAEHR_e_BlkHtrEngInClntSnsr CeAEHR_e_BlkHtrEngMetalSnsr CeAEHR_e_BlkHtrRadOutClntSnsr CeAEHR_e_BlkHtrIntakeAirSnsr 6.0°C 5.0°C >15.0°C CeAEHR_e_BlkHtrBlockClntSnsr >87.00 L/min 0.1 - 17.0 seconds <77.0 seconds >300.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A block heater is detected if a drop is	>1.8 °C		
					IAT Drop Criteria:			
					The sensor will be used as IAT for this method	CeAEHR_e_BlkHtrIntakeAirSnsr		
					A block heater will be detected if:			
					IAT has a drop of during a drive defined by:	>5.0 °C		
					Drive time	>400.0 seconds		
					Vehicle speed	>24.0kph		
					Addtional drive time is provided when vehicle speed drops below above threshold as follows	0.5times the seconds with vehicle speed below the threshold above		
					This detection method will abort if the engine is off	> 180.0 seconds		
					OR			
					Engine runtime	> 1,800 seconds		
					Temperature Derivative Criteria:			
					Derivative will be monitored using	CeAEHR_e_BlkHtrBlockClntSnsr		
					Derivative will be monitored once coolant flow is	>-1.00L/min		
					AND	5.0 - 15.0 seconds		

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 =================	< 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) - LZO	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 sensorthat is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr	< X Ohms X is equal to: Temp Sensor 1: 48 Ohms Temp Sensor 2: 48.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 8: 9.0 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.
Engine Coolant Temp Sensor Circuit High (Diesel L6 ATM - LZO)	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 sensorthat is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr	> X Ohms X is equal to: Temp Sensor 1: 235,000 Ohms Temp Sensor 2: 235,000 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 8: 364,600 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.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent (Diesel L6 ATM - LZO)	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 sensorthat is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg 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 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 Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example*****	5.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C 7.4 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.
			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 caluculated 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. ****************************					

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) minus43.1 °C. The target temperature for this range will not drop below 58.9 ° 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 EngineTorqueEstInaccurate MAF_SensorFA ETHR_CoolantEnergyModel ETHR_RemedialActionLeveil ETHR_RemedialActionLevel2 ETHR_RemedialActionLevel3 EECR_EngineOutlet_FA > 1,800.0 seconds 10.0 - 1,800.0 seconds <39.5 °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 Cumulative coolant flow	>5.0 °C >0.00		

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) minus43.1 °C. The target temperature for this range will not drop below 58.9 ° 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_RemedialActionLeveil ETHR_RemedialActionLevel2 ETHR_RemedialActionLevel3 EECR_CylHeadMetal_FA > 1,800.0 seconds 10.0- 1,800.0 seconds <39.5 °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 - LZO)	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 sensorthat is equal to: EngMetalHeadTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssgnmnt Temperature Sensor 5: CeEECR_e_NoUseAssgnmnt Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr	< X Ohms X is equal to: Temp Sensor 1: 48 Ohms Temp Sensor 2: 48.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 8: 9.0 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.
Cylinder Head Temperature Sensor Circuit High (Diesel L6 ATM - LZO)	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 sensorthat is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt Temperature Sensor 8: CeEECR_e_EngMetalHeadTempSnsr	> X Ohms X is equal to: Temp Sensor 1: 235,000 Ohms Temp Sensor 2: 235,000 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 8: 364,600 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.
Cylinder Head Temperature Sensor “A” Circuit Intermittent/ Erratic (Diesel L6 ATM - LZO)	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 sensorthat is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt		Diagnostic is Enabled No Active DTC's	 EECR_EMT1_Erratic_TFTKO EECR_EMT1_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 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 Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading	 5.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C 7.4 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.
			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 caluculated 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. *****************************					

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	 SBR_RlyFA 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 Q	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 SBR_RlyFA 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 Q	Run crank voltage	> 5.0 V	10 failures out of 20 samples	Type B, 2 Trips
					Run crank voltage	> 11.0V		
					Engine not cranking		100 ms/samples	
					FTZM Run crank voltage	> 8.00		
					Sensor Bus relay Commanded on			
					No DTC active	SBR_RlyFA P1103		
					At least one valid value received from serial communication			

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^A[- (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 SBR_RlyFA 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^A[- (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 SBR_RlyFA 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 manifold temperature sensor	The difference in absolute value between temperature measured by the rail temperature sensor and the reference sensor (Manifold Temperature Sensor) is	> 20.00	Run crank voltage OR Time since engine is rotating No error for Engine Not Running timer Engine soak time No Fault Active in the Manifold Temperature Sensor MnfdTempSensorFA The diagnostic feedback protocol is providing information about rail temperature (Engine coolant temperature OR ECT_OBD_GlobalCoolTmpEnbl (refer to "OBD Coolant Enable Criteria" section)) Ambient temperature	> 5.0 V < 3.00 > 28,800.00 == FALSE > -40.00 °C > KeFHPI_T_AmbTempMin	21.00 failures out of 42.00 samples 6.25 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 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:	> 1,000 s > -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_Double Track > 15,000 s	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.
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	57.0 °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 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 > 58.9 °C > **P01F0 - Heat To Coolant Min 2D** < 33.0 seconds < 8,192 Half Cylinder Mode	110 seconds out of a 130 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.
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	1.00==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] >-8 [kPa/s] AND <7 [kPa/s] >2,500.00 [rpm] AND <4,000.00 [rpm]	100 fail counters over 140 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	>=89.30 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >=78.80 [%] 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 **************************** Actual pump speed **************************** NelCPD_b_IC_PmpMtrCurrFA OR Pump Current OOR Error **************************** 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 **************************** = False **************************** >=11.0 Volts False > 10.00 C =TRUE <= 126.00 C =FALSE ****************************	6 failures out of 8 samples 1000ms / sample	Type A, 1 Trips

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] >-8 [kPa/s] AND <7 [kPa/s]	240.00 fail counters over 300.00 sample counters sampling time is 25ms	Type A, 1 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	>1,200.00 [rpm] AND <1,875.00 [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	>=89.30 [%] if throttle control is active (Refer to "Other AICR DSL flags" Free Form) >=78.80 [%] if throttle control is NOT active (Refer to "Other AICR DSL flaas" 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.
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 (Model Based)	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.	Mean residual error: residual error average. Residual error = difference between the punctual residual and threshold (depends on air ambient pressure and temperature, engine speed and load). Punctual residual = difference between estimated air mass provided by MAF (difference between estimated cylinder nominal total flow and estimated HP and LP EGR total flows) and fresh air measured by MAF sensor.	A o	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	**P0401: Insufficient HP 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 <= 2 [rpm], FALSE if > 16.00 [rpm] > 38 [counts] TRUE if <= 0.10 [mm^3], FALSE if > 0.40 [mm^3] > 26 [counts]	Residual error average over 200.00 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.
					HP EGR flow request is steady state: |HPFLOW-HPFLOW_old| in range, with hysteresis	TRUE if <= 3.00 [mg], FALSE if > 4.00 [mg]		
					for a minimum number of samples	> 49.00 [counts]		
					No active transition from a combustion mode to another one	==TRUE		
					Outside Air Temperature	> -20.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 25.00 [°C] ==TRUE		
					Desired HP EGR flow	> **P0401: Minimum desired HP EGR flow** [mg]		
					Desired fuel quantity	> **P0401: Insufficient HP EGR flow Min fuel enabling condition** [mm^31		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						AND < **P0401: Insufficient HP EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402, P049B, P049C: Outside air temperature" Free Form		
					Desired LP EGR split	< 0.62		
					Boost Control is Active or in open loop	Refer to "Boost Control in Closed Loop" Free Form		
					Cylinder nominal total flow estimation is valid	== TRUE		
					HP EGR total flow estimation is valid	== TRUE		
					LP EGR total flow estimation is valid	== TRUE		
					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.
Exhaust Gas Recirculation (EGR) Flow Excessive (Model Based)	P0402	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 higher 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 leakages (excessive 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 a leakage) that leads to exceed the OBD limits.	Mean residual error: residual error average. Residual error = difference between the punctual residual and threshold (depends on air ambient pressure and temperature, engine speed and load). Punctual residual = difference between estimated air mass provided by MAF (difference between estimated cylinder nominal total flow and estimated HP and LP EGR total flows) and fresh air measured by MAF sensor.	A o	Calibration on diagnostic enabling	**P0402: Excessive HP EGR flow monitor enabling** ==TRUE	Residual error average over 125.00 sample counters:	Type B, 2 Trips
					Engine Running	==TRUE	sampling time is 25 ms	
					Cranking ignition in range	Battery voltage > 11.00 [V]		
					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		
					Desired EGR rate	> 0 [%]		
					Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis	TRUE if <= 2 [rpm], FALSE if > 16.00 [rpm]		
					for a minimum number of samples	>38 [counts]		
					Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis	TRUE if <= 0.10 [mm^3], FALSE if > 0.40 [mm^3]		
					for a minimum number of samples	> 26 [counts]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					HP EGR flow request is steady state: |HPFLOW-HPFLOW_old| in range, with hysteresis	TRUE if <= 3.00 [mg], FALSE if > 4.00 [mg]		
					for a minimum number of samples	> 49.00 [counts]		
					No active transition from a combustion mode to another one	==TRUE		
					Outside Air Temperature	> -20.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR	> 25.00 [°C]		
					OBD Coolant Enable Criteria	==TRUE		
					Desired HP EGR flow	**P0402: Maximum <desired HP EGR flow** [mg]		
					Desired fuel quantity	> **P0402: Excessive 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.
						< **P0402: Excessive HP EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402, P049B, P049C: Outside air temperature" Free Form		
					Boost Control is Active or in open loop	Refer to "Boost Control in Closed Loop" Free Form		
					Cylinder nominal total flow estimation is valid	== TRUE		
					HP EGR total flow estimation is valid	== TRUE		
					LP EGR total flow estimation is valid	== TRUE		
					All enabling conditions last for a time	>= 0.80 [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**	Monitor Enable Condition Diagnosis System Disable AND RunCranklgnInRange RunCrankLow for a calibratable time AND RunCrankLowTimeErr	1.00 == FALSE ==TRUE >= 28,800.00 == TRUE == FALSE	Function Task: 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	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes.The monitor compares the EGRT raw value (resistance value or a temperature value in case of digital sensor) with a minimum threshold.	**Analog Sensor:** The monitor compares the EGRT 1 raw value (resistance value) with a minimum threshold; if this threshold is overcome, a OOR Low error is detected. **Digital termocouple sensor:** The monitor compares the EGRT 1 raw value (temperature value) with a minimum threshold;	< 10.00 [0] < -72.80 [°C]	Monitor Enable Condition AND RunCranklgnInRange AND Egine Mode Crank AND Diagnosis System Disabled AND RunCrankActive NAC10 Fault	1.00 == TRUE == FALSE == FALSE == TRUE == FALSE	19 failures out of 25 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	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes.The monitor compares the EGRT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog Sensor:** The monitor compares the EGRT 1 raw value (resistance value) with a maximum threshold; if this threshold is overcome, a OOR Hgh error is detected. **Digital termocouple sensor:** The monitor compares the EGRT 1 raw value (temperature value) with a maximum threshold	> 20,000,000.00 [Q] > 1,289.00 [°C]	Monitor Enable Condition AND RunCrankIgnInRange AND Egine Mode Crank AND Diagnosis System Disabled AND RunCrankActive NAC10 Fault	1.00 == TRUE == FALSE == FALSE == TRUE == FALSE == FALSE == FALSE	19 failures out of 25 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.	1.00 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.	==TRUE than DiffTemp >20.00 else DiffRes> 200.00	Monitor Enable Condition AND RunCrankIgnInRange AND RunCrankActive AND Diagnosis System Disabled AND Engine Mode Crank	0.00 == TRUE == TRUE == FALSE == FALSE	12 failures out of 25 samples Function Task: 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	The Catalyst (CC DOC) monitor only runs during DPF regeneration and compares the CC DOC released oxidation heat and the post-injected fuel quantity both evaluated inside a determined portion of the DPF regeneration itself. This comparison (ratio) produces an Aging Index that shall be greater than the efficiency threshold, in case of fresh (efficient) Catalyst. If, instead, the so calculated Aging Index is below the efficiency threshold, the diagnosis reports fail because the Catalyst is too much damaged to play well its role (conversion inefficiency detected) and shall be replaced. It is needed that post-injection is enabled during CC DOC monitor in order to produce enough exothermic heat across the Catalyst to evaluate the component conversion efficiency in a reliable way.	Catalyst Aging Index < Threshold If - Catalyst EWMA filter enabling calibration = TRUE AND - Catalyst conversion inefficiency previously detected (Catalyst Fault Active = TRUE) Then: Catalyst Aging Index < Repass Threshold If the rich combustion monitor has been enabled (refer to 'P0421 -Warm Up Catalyst Efficiency Below Threshold Bank 1 (OBD2, Rich combustion based monitor)' section of this document) together with the DPF regeneration portion AND If the DOC heat up phase, identified by the condition of DOC downstream temperature greater than a calibratabe threhsold during DPF regeneration for a minimum calibratable debounce time, can not be reached AND The DPF regeneration monitor portion has run	Aging Index < 0.08 [value] If EWMA Enbl Cal = 1.00 [Boolean] AND Catalyst FA = CAT_CatSysEffLoB1_FA Then: Aging Index < 0.08 [value] Catalyst monitor slection = CeCATD_e_RgnCatMontr Combustion mode = DPF regeneration AND NOT(DOC downstream temperature > 600.00 for at least 60.00 [°C])	Rich combustion based monitor with DPF regeneration portion OR DPF regeneration based monitor enabled AND No active DTCs: AND - Catalyst up temperature sensor not in fault (Fault Flag = FALSE) AND - Catalyst down temperature sensor not in fault (Fault Flag = FALSE); Temperature Learning concluded: - Number of elapsed samples (task time = 100 [ms]) equal to calibration; Catalyst monitor status is DISABLED if: - DPF regeneration disabled OR	Catalyst monitor slection = CeCATD_e_RgnCatMontr AND ReportingEnabled= 1.00 [Boolean] AND Cat Up Temp Snsr Flt = NOT (EGT_SnsrCatUpFlt) AND Cat Dwn Temp Snsr Flt = NOT (EGT_SnsrCatDwnFlt); Samples nr. = 10.00 [Counter]; Catalyst monitor status is DISABLED if: DPF_DPF_St = SootLoading [Enumerative] OR	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)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported by the Catalyst (CC DOC) monitor.	reporting a test FAIL, then this latter is considered to make a report, converting the test result through a dedicated map (to bring in the same range of the rich combustion based monitor) and comparing it with the same threshold mentioned above.	DPF regeneration test fail if test result < 0.00 DPF regeneration portion test result converted through **DPFtoRichConversion**	- Injection system in fault (Fault Flag = TRUE) OR - Ambient temperature information in fault (Fault Active = TRUE) OR - Catalyst up exhaust flow estimation in fault (Fault Flag = TRUE) OR Ambient pressure lower than calibration OR Ambient temperature lower than calibration OR - Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) OR HC unloading enabled; Catalyst monitor status	Injection System Flt = FUL_GenericInjSysFlt OR Amb Temp FA = CAT_OutsideTempFA OR Cat Up Exh Flow Flt = EXF_TotExhCatUpFlt OR Amb Press < 72.00 [KPa] OR Amb Temp < 252.00 [K] OR Catalyst monitor already performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] OR HCI_DeHC_ExhInjDsbl = TRUE [Boolean];	If - Catalyst EWMA filter enabling cailibration = TRUE (EWMA Enbl Cal = 1.00 [Boolean]) 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					can move from DISABLED to TRIGGERED if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND -Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND	Catalyst monitor status can move from DISABLED to TRIGGERED if: DPF_DPF_St # SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUpFlt) AND Ambient conditions always satisfied while engine running: Amb Press > 74.36 [KPa] AND Amb Temp > 253.00 [K]	- 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 - 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.
					- Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - If DPF regeneration has been interrupted in previous driving cycle or in current driving cycle Then: Engine coolant temperature lower than calibration AND - Catalyst up exhaust temperature (by sensor) lower than calibration AND HC unloading disabled; Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and post injected fuel integrator are both	AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND If Interrupted DPF regeneration counter > 0 [Counter] Then: Eng Cool Temp < 120.00 [°C] AND Cat Up Temp Snsr < 783.15 [K]; AND HCI_DeHC_ExhlnjDsbl = FALSE [Boolean]; Catalyst monitor status can move from TRIGGERED to ENABLED (oxidation heat release integrator and post injected fuel integrator are both		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enabled) if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND -Ambient conditions always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in	enabled) if: DPF_DPF_St # SootLoading [Enumerative] AND Injection System Fit = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat Up Exh Flow Fit = NOT (EXF_TotExhCatUpFlt) AND -Ambient conditions always satisfied while engine running: Amb Press > 74.36 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current drivinq cycle		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - Catalyst up exhaust temperature (by sensor) higher than calibration AND - Post injection enabled AND - Catalyst up exhaust flow estimation in range AND - Catalyst up exhaust temperature (by sensor) in range AND - Post injection fuel rate in range AND - Consecutive time in which Post Injection Fuel rate is lower than a threshold is less than a calibration AND HC unloading disabled;	(Catalyst monitor shall run only once per driving cycle) [Boolean] AND Cat Up Temp Snsr > 593.00 [K] AND FUL_PostEnbl = TRUE [Boolean] AND 0.00 < Cat Up Exh Flow < 1,000.00 [g/s] AND 0.00 < Cat Up Temp Snsr [K]< 1,000.00 AND 0.00 < Post Inj Fuel Qnty [g/s] < 1,000.00 AND Post Inj Fuel Qnty [g/s] < -1,000.00 for less than 0.00 [s] AND HCI_DeHC_ExhInjDsbl = FALSE [Boolean]; Oxidation heat release		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Oxidation heat release integrator and post injected fuel integrator are both frozen if: - Engine not running OR - Catalyst up exhaust flow estimation out of range OR - Catalyst up exhaust temperature (by sensor) out of range OR - Post injection fuel rate out of range OR - Consecutive time in which Post Injection Fuel rate is lower than a threshold is more than a calibration Catalyst monitor status can move from ENABLED	integrator and post injected fuel integrator are both frozen if: - Engine not running OR Cat Up Exh Flow [g/s] < 0.00 OR Cat Up Exh Flow > 1,000.00 [g/s] OR Cat Up Temp Snsr [K] < 0.00 OR Cat Up Temp Snsr [K] > 1,000.00 OR Post Inj Fuel Qnty [g/s] < 0.00 OR Post Inj Fuel Qnty [g/s] > 1,000.00 OR Post Inj Fuel Qnty [g/s] < -1,000.00 for more than 0.00 [si		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(oxidation heat release integrator and post injected fuel integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if: - DPF regeneration enabled AND - Injection system not in fault (Fault Flag = FALSE) AND - Ambient temperature information not in fault (Fault Active = FALSE) AND - Catalyst up exhaust flow estimation not in fault (Fault Flag = FALSE) AND -Ambient conditions	Catalyst monitor status can move from ENABLED (oxidation heat release integrator and post injected fuel integrator are both enabled) to DONE (integrators are stopped and the ratio between the total integrated oxidation heat and the total integrated injected fuel is performed with the consequent creation of the Catalyst Aging Index to be compared with the Fault Threshold --> Diagnostic test evaluation trigger) if: DPF_DPF_St # SootLoading [Enumerative] AND Injection System Flt = NOT (FUL_GenericInjSysFlt) AND Amb Temp FA = NOT (CAT_OutsideTempFA) AND Cat Up Exh Flow Flt = NOT (EXF_TotExhCatUoFlt)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					always satisfied while engine running: Ambient pressure higher than calibration AND Ambient temperature higher than calibration AND - Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) AND - Integrated post injected fuel quantity higher than curve AND HC unloading disabled	AND -Ambient conditions always satisfied while engine running: Amb Press > 74.36 [KPa] AND Amb Temp > 253.00 [K] AND Catalyst monitor not yet performed successfully in current driving cycle (Catalyst monitor shall run only once per driving cycle) [Boolean] AND Intgr Post Inj Fuel Qnty > **CatCrtdMaxFuel** [g] AND HCI_DeHC_ExhlnjDsbl = FALSE [Boolean]		

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	This diagnostic is to detect if the fan system is undercooling. It does so by determining if the measured fan speed is sufficiently lower than the expected fan speed. The expected fan speed is modeled applying startup/ rampup/transport time delays, applying rate limiting to increasing and decreasing fan commands, and applying supply voltage compensation. If the actual fan speed is lower than the modeled fan speed by a calibratable threshold, the fault maturation for the corresponding DTC increments. The diagnostic employs a standard “X of Y” approach, where the diagnostic reports a failure to the diagnostic data manager if "X" faulted evaluations occur within each test consisting of "Y" samples. Only after first diagnostic activation per key cycle, the fan will be held commanded on for enough time to ensure this monitor has an	This DTC compares the Measured Fan Speed and the Expected Fan Speed and ensures that it falls withing an acceptable margin of error (low side error comparison)	<= Speed Low Limit [Supporting Table] **P0494_LIN_Threshold**	a] Diagnostic Enabled b] Fan Commanded On c] Diagnostic System Disabled(via service tool) d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active (DTC U063200) g] LIN Bus Continuous Operation Fault Active (DTC P135C) h] Fan Our of Range High Fault Active (DTC P30EF) i] Fan Out Of Range Low Fault Active (DTC P30EE) j] Fan speed is above a min fan speed threshold (rpm)	a] =1 [True if 1; False if 0] b] =TRUE c] =FALSE d] =TRUE e] =TRUE f] =FALSE g] =FALSE h] = FALSE i] = FALSE j] >= 580.00	16 failures / 20 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.
		opportunity to mature a decision.						

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 (Model Based)	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.	Mean residual error: residual error average. Residual error = difference between the punctual residual and threshold (depends on air ambient pressure and temperature, engine speed and load). Punctual residual = difference between estimated air mass provided by MAF (difference between estimated cylinder nominal total flow and estimated HP and LP EGR total flows) and fresh air measured by MAF sensor.	A o	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 <= 6.00 [rpm], FALSE if > 10.00 [rpm] > 25.00 [counts] TRUE if <= 0.15 [mm^3], FALSE if >0.18 [mm^3] > 25.00 [counts]	Residual error average over 100.00 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.
					LP EGR flow request is steady state: |LPFLOW-LPFLOW_old| in range, with hysteresis	TRUE if <= 1.00 [mg], FALSE if > 1.20 [mg]		
					for a minimum number of samples	> 15.00 [counts]		
					No active transition from a combustion mode to another one	==TRUE		
					Outside Air Temperature	> -20.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 60.00 [°C] ==TRUE		
					Desired LP EGR flow	**P049B: Minimum >desired LP EGR flow** [mg]		
					Desired fuel quantity	> **P049B: Insufficient LP 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.
						< **P049B: Insufficient LP EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402, P049B, P049C: Outside air temperature" Free Form		
					Desired LP EGR split	> 0.00		
					Boost Control is Active or in open loop	Refer to "Boost Control in Closed Loop" Free Form		
					Cylinder nominal total flow estimation is valid	== TRUE		
					HP EGR total flow estimation is valid	== TRUE		
					LP EGR total flow estimation is valid	== TRUE		
					All enabling conditions last 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.
Exhaust Gas Recirculation B Flow Excessive (Model Based)	P049C	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 higher 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 valve leakages (excessive 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 a leakage) that leads to exceed the OBD limits.	Mean residual error: residual error average. Residual error = difference between the punctual residual and threshold (depends on air ambient pressure and temperature, engine speed and load). Punctual residual = difference between estimated air mass provided by MAF (difference between estimated cylinder nominal total flow and estimated HP and LP EGR total flows) and fresh air measured by MAF sensor.	> 0	Calibration on diagnostic enabling	**P049C: Excessive LP EGR flow monitor enabling** ==TRUE	Residual error average over 250.00 sample counters:	Type B, 2 Trips
					Engine Running	==TRUE	sampling time is 25 ms	
					Cranking ignition in range	Battery voltage > 11.00 [V]		
					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		
					Desired EGR rate	> 0 [%]		
					Engine speed is steady state: |RPM-RPM_old| in range, with hysteresis	TRUE if <= 6.00 [rpm], FALSE if > 10.00 [rpm]		
					for a minimum number of samples	> 25.00 [counts]		
					Fuel request is steady state: |FUEL-FUEL_old| in range, with hysteresis	TRUE if <= 0.15 [mm^3], FALSE if >0.18 [mm^3]		
					for a minimum number of samples	> 25.00 [counts]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					LP EGR flow request is steady state: |LPFLOW-LPFLOW_old| in range, with hysteresis	TRUE if <= 1.00 [mg], FALSE if > 1.20 [mg]		
					for a minimum number of samples	> 15.00 [counts]		
					No active transition from a combustion mode to another one	==TRUE		
					Outside Air Temperature	> -20.00 [°C]		
					Ambient Pressure	> 69.60 [kPa]		
					Engine Coolant Temperature OR OBD Coolant Enable Criteria	> 60.00 [°C] ==TRUE		
					Desired LP EGR flow	< **P049C: Maximum desired LP EGR flow** [mg]		
					Desired fuel quantity	> **P049C: Excessive LP EGR flow Min fuel enabling condition** [mm^{A}31		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						AND < **P049C: Excessive LP EGR flow Max fuel enabling condition** [mm^3]		
					Outside air temperature in range	Condition must be TRUE. Refer to "P0401, P0402, P049B, P049C: Outside air temperature" Free Form		
					Boost Control is Active or in open loop	Refer to "Boost Control in Closed Loop" Free Form		
					Cylinder nominal total flow estimation is valid	== TRUE		
					HP EGR total flow estimation is valid	== TRUE		
					LP EGR total flow estimation is valid	== TRUE		
					All enabling conditions last for a time	>= 0.35 [s]		

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 indicates that actual engine speed is lower than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient	> 75.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
					Coolant Temp	> 60 °C	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
			Filter coefficient	0.00175				
					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	< 1.24 mph, 2kph		
					Commanded RPM delta	< 25 rpm		
					Idle time	> 5 sec		
					For manual transmissions: Clutch Pedal Position	> 12.00 pct		
					or Clutch Pedal Position	< 75.00 pct		
						PTC not active		
						Transfer Case not in 4WD LowState		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimitAND 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P2771		
					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 indicates that actual engine speed is higher than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient	< -150.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
					Coolant Temp	> 60 °C	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
			Filter coefficient	0.00175				
					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	< 1.24 mph, 2kph		
					Commanded RPM delta	< 25 rpm		
					For manual transmissions: Clutch Pedal Position	> 12.00 pct		
					or Clutch Pedal Position	< 75.00 pct		
						PTC 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_EngSpdReqlntvType = CeTESR_e_EngSpdMinLimitAND 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		
					All of the above met	> 5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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.
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 Enable Starter motor criteria met (Starter motor not engaged) Enable engine speed criteria met (Engine speed higher than) Enable run crank criteria met	1.00 1.00 1.00 >=400.00 1.00	400 failures out of 500 samples 12.5 ms / sample	Type C, 1 Trip No MIL

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 Enable run crank criteria met	1.00 1.00	400 failures out of 500 samples 12.5 ms / sample	Type C, 1 Trip No MIL

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 or crank	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 or crank	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 3,197.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	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 3,197.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	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 or crank	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 or crank	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 or crank	255/6 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	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.	Table, f(Engine, Oil Temp). **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 81.00 Nm	Ignition State	Accessory, run or crank	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 or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is	80.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 159	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			greater than its redundant calculation plus threshold				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	81.00 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 than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, down time multipier0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 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 or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Immediate Engine Request is greater than its redundant	81.00 Nm	Ignition State	Accessory, run or crank	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.
			calculation plus threshold				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 multipier	
			Idle speed control calculated predicted minimum torque request	Minimum value (	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			exceeds calculated torque limit	**P16F3_Speed Control External Load f(Oil Temp, RPM)** , **P16F3_Speed Control External Load Max f (Vehicle Speed, RPM)** + **P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 81.00 Nm			0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Minimum value (**P16F3_Speed Control External Load f(Oil Temp, RPM)** , **P16F3_Speed Control External Load Max f (Vehicle Speed, RPM)** + **P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**) + 81.00 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.
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	3,197.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	3,197.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 75 ms continuous, 0.5 down time multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 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 between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	119.00 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	80.00 Nm	Ignition State	Accessory, run or crank	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 or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			1. Absolute difference of	500		Engine speed greater	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			redundant calculated engine speed above threshold	RPM		than 0 RPM	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 or crank	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 or crank	Up/down timer 245 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 81.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 463 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.
				Low Threshold -81.00 Nm				
			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 or crank	Up/down timer 463 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 81.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	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.
			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	1.80.00 Nm 2. N/A 3.80.00 Nm 4.80.00 Nm	3. &4.: Ignition State	1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 81.00 Nm 3. &4.: Accessory, run or crank	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 or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its	3,197.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 75	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold				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 (**P16F3_Speed Control External Load f(Oil Temp, RPM)** , Sum **old P16F3_Speed Control External Load Max f(Vehicle (Speed, RPM)** , **old P16F3_Speed Control External Load Offset f(Vehicle Sped, Transmission Oil Temp)**)	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.
				+ 81.00 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	119.00 Nm	Ignition State	Accessory, run or crank	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 and its redundant calculation is out of bounds given by threshold range	1. 3.50 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475.00 475.00 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.
			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					
			Commanded axle torque is greater than its redundant calculation by threshold	3,197.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	4,795.50 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 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	
			AC friction torque is greater than commanded by AC control software	40.00 Nm	Ignition State	Accessory, run or crank	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	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 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	
			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 or crank	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	119.89 Nm 0.05 KPH/Second	Ignition State	Accessory, run or crank	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 commanded Engine Torque and its redundant calcultion is less than a threshold	4,096.00 Nm 4,795.50 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,047.97 ms continuous, 0.5 down time multipier	
			Requested fuel mass is greater or equal to its	9.09 mg	Engine running		Up/down timer 458.94	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			redundant calculation plus threshold		No rich combustion mode No cranking phase No fuel cut off request		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	81.00 Nm 81.00 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	81.00 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 10.13Nm	Engine running		Up/down timer 462.50 ms continuous, 0.5 down time multiplier	
			Start Up Engine Friction Compensation rate of change haher than a threshold AND	40.50 Nm/task_12.5	Engine running		Up/down timer 101.78 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 higher than threshold	1.00 Nm				
			Limited Immediate Indicated Torque request is greater than its redundant calculation plus threshold	81.00 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	81.00 Nm -81.00 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	10.71 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	10.71 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)	64.75 us additional value for emission tests: 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)	64.75 us additional value for emission tests: 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	
			Absolute difference between Main Correction and its redundant	10.71 mm3	Engine running No rich combustion mode		Up/down timer 158.94 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			calculation greater than or equal to threshold				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	**P16F3_CB safety deadband threshold f (Fuel Rail Pressure)** us **P16F3_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	**P16F3_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	10.71 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	**P16F3_SQA safety deadband threshold f (Fuel Rail Pressure)** us	Ignition State	Accessory, run or crank	Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			Oil Pump Low Pressure <jTT3Ci i notion yrcoicr		Engine running		Up/down timer 462.50	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			then zero OR Oil Pump Low Pressure Offset Friction lower then threshold	 -20.00 Nm			ms continuous, 0.5 down time multiplier	
			Rate of change on fuel mass compensaton for coolant temperature greater than P2D2 threshold	45.45 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	45.45 mg/sec	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 458.94 ms continuous, 0.5 down time multiplier	
			Absolute value of fuel mass compensated for vehicle speed greater than threshold	4.55 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	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 Adjustment energizing time correction lower then threshold	**P16F3_VCA safety max deadband threshold f(Fuel Rail Pressure)** us **P16F3_VCA safety min 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.
			Desired Immediate Indicated torque greater then its redundant calculation plus threshold	81.00 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: 195.00 Nm	Ignition State	Accessory, run or crank	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 or crank	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 is higher than the maximum expected combustion mode OR		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.
			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	**P16F3JBT 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)	50.00 us	Engine Cranking or engine runnig		Up/down timer 200.00 ms continuous, 0.5 down time multiplier	
			cumulative SOI absolute difference beetween secured SOI and Programmed SOI greater than threshold (torque forming pulses only)	2.00 Degrees	Engine Cranking or engine runnig		Up/down timer 200.00 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.
			Absolute value of the difference between the calculated EIA (VSI specific) compensation and its redundant calculation greater than threshold	**P16F3_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 autorithy	-4.56 mg 4.56 mg	Engine running No rich combustion mode No cranking phase No fuel cut off request	Accessory, run or crank	Up/down timer 500.00 ms continuous, 0.5 down time multiplier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Desired Engine Torque). See supporting tables: **P060C_Delta MAP Threshold f(Desired Engine Torque)**		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	81.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 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.
Starter Relay Control Circuit Open (Conventional)	P0615	Controller specific output driver circuit diagnoses the Starter relay (Conventional) high sided driver for an 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 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 (Conventional)	P0616	Controller specific output driver circuit diagnoses the Starter relay (Conventional) 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	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 (Conventional)	P0617	Controller specific output driver circuit diagnoses the Starter 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	Starter control diag enable = TRUE 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 C, 1 Trip No MIL
			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	==1.00 [Boolean]	time in faulty condition) Task rate = 50 ms	
					and Generator 1 F-Terminal Circuit test fault in key on)	== FALSE		
					and Engine speed	< 1,000.00 [rpm]		
					and L-Terminal_FA	== FALSE		
					and Generator 1 F-Terminal present	== 1.00 [Boolean]		
					and Generator PWM command	> 42.00 [Pct]		
					and No Active DTCs	CrankSensor_FA CamSensorAnyLocationFA		
					and Engine Running	== TRUE		
					and Generator control disabled	== FALSE		
					and Generator Service Device Control Command Request	== FALSE		

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 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.
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 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.
Control Module Power Relay Control Circuit	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	Powertrain relay Open circuit diagnostic diagnostic enable = TRUE Run/Crank Voltage	1.00 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.
Control Module Power Relay Control Circuit Low Voltage	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 Q impedance between output and controller ground	Powertrain relay Low Side driver short to ground diagnostic diagnostic enable = TRUE Run/Crank Voltage	1.00 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.
Control Module Power Relay Control Circuit High Voltage	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	Powertrain relay Low Side driver short to power diagnostic enable = TRUE Run/Crank Voltage	1.00 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.
Control Module Power Relay Feedback Circuit High Voltage	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 high voltage feedback circuit diagnostic enable = TRUE Powertrain relay commanded "OFF" No active DTCs:	1.00 >=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 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.
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 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.
Unable to Engage Neutral	P073D	Detects the inability to achieve or remain in Neutral.	Actual Arbitrated Transmission Range, increment fail timer	≠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	= Good value = Neutral =False =False =True = True =True =Park =False	fail time >= 1,800.00	Type B, 2 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, increment fail timer	#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	= Good value = Reverse =False =False =True =True =True =Park =False	fail time >= 1,800.00	Type B, 2 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 Low	Shifter park Position measured Switch A signal	<=0.00	enabling calibration	0.00	0.00 failures out of 0.00 samples (SW runs at 25ms loop)	Type B, 2 Trips
			Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts 1023 counts = 5 Volts			16 Failures out of 20 Samples (SIB is 5 msec loop)	

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	Shifter Park Position Measured Switch A signal	>= 0.00	enabling calibration	0.00	0.00 failures out of 0.00 samples (SW runs at 25ms loop)	Type B, 2 Trips
			Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V			16 Failures out of 20 Samples (SIB is 5 msec loop)	

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 Performance	P07B5	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Shifter Park Position Measured Switch A signal	>0.00 and <0.00	DTC not set Enable Calibration	P07B3 OR P07B4 0.00	0.00 failures out of 0.00 samples	Type B, 2 Trips
			Park Position Measured Voltage	(544<X<753 counts) 53.2% < X < 73.7% of 5 Volts. 1023 Counts = 5 V	DTC not set	P07B3 OR P07B4	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	

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	Shifter Park Position Measured Switch B signal	<= 0.00	Enable Calibration	0.00	0.00 failures out of 0.00 samples	Type B, 2 Trips
			Park Position Measured Voltage	< Low 446 counts 446 counts = 43.6% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	

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	Shifter Park Position Measured Switch B signal	>= 0.00	Enable Calibration	0.00	0.00 failures out of 0.00 samples	Type B, 2 Trips
			Park Position Measured Voltage	> High 853 counts 853 counts = 83.3% of 5 Volts. 1023 Counts = 5 V	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	

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.	Shifter Park Position Measured Switch B signal	>0.00 and <0.00	DTC not set Diagnostic Enable Calibration	P07B9 OR P07BA 0.00	0.00 failures out of 0.00 samples	Type B, 2 Trips
			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	=TRUE P07BA or P07B9	2000 Failures out of 2500 Samples =10 sec (SIB is 5 msec loop)	

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:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB =FALSE = TRUE <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 .	4,800 failures out of 6,000 samples 12.5 ms rate	Type B, 2 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, increment fail timer	#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	= Good value = Park =False =False =True = True =True =Park =False	fail time >= 1,800.00	Type B, 2 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, increment fail timer	#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	= Good value = Drive =False =False =True = True =True =Park =False	fail time >= 1,800.00	Type B, 2 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 Measured Alpha1 on Sensor 1 OR percentages disagree	Outside shifter path of movement >= **Alpha Disagreement Limit** See Supporting Tables	Diagnostic Enable Calibration	0.00	0.00 failures out of 0.00 samples	Type B, 2 Trips
			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 = True > 12.00%	Not Fault Active Controller has been awake for at least	P082B, P082C 0.05 seconds	10.00 failures out of 12.00 samples 25ms loop	

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	0.05 seconds	10.00 failures out of 12.00 samples 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.
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	0.05 seconds	10.00 failures out of 12.00 samples 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.
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 Measured Beta 1 on Sensor 1 OR percentages disagree by	Outside shifter path of movement >= **Beta Disagreement Limit** See Supporting Tables	Diagnostic Enable Calibration	0.00	0.00 failures of of 0.00 samples	Type B, 2 Trips
			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	P082E, P082F 0.05 seconds	10.00 failures out of 12.00 samples 25 ms loop	

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	0.05 seconds	10.00 failures out of 12.00 samples 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.
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	0.05 seconds	10.00 failures out of 12.00 samples 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.
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 Measured Alpha 2 on Sensor 2 OR percentages disagree	Outside shifter path of movement >= **Alpha Disagreement Limit** See Supporting Tables	Diagnostic Enable Calibration	0.00	0.00 failures out of 0.00 samples	Type B, 2 Trips
			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	P089C, P089D 0.05 seconds	10.00 failures out of 12.00 samples 25 ms loop	

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	0.05 seconds	10.00 failures out of 12.00 samples 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.
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	0.05 seconds	10.00 failures out of 12.00 samples 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.
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 Measured beta 2 on Sensor 2 OR percentages disagree	Outside shifter path of movement >= **Beta Disagreement Limit** See Supporting Tables	Diagnostic Enable Calibration	0.00	0.00 failures out of 0.00 samples	Type B, 2 Trips
			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	P08A1, P08A2 0.05 seconds	10.00 failures out of 12.00 samples 25 ms loop	

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	0.05 seconds	10.00 failures out of 12.00 samples 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.
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	0.05 seconds	10.00 failures out of 12.00 samples 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.
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.
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	80.00 fails out of 100.00 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	80.00 fails out of 100.00 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.
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 = 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.
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 <-12.50 degrees >280.00 degrees <270.00 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 more than	> **PumpSpdPerfErrorLim** rpm > **PmpSpdPerfDiagDly** 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 > 10.00 C =TRUE <= 126.00 C =FALSE ****************************	6 failures out of 8 samples 1000ms / 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 Injector Temperature - Exhaust Gas Temperature Not Plausible	P10D1	This monitor measures the coil temperature of the DEF injector, and compare it to with reference temperature after long soak.	Difference between coil temperature and reference temperature greater than calibratable value.	> **P10D1_CoilTempRatTempRef**	Test enabled by calibration (TRUE->Enable False -> Disable) DEF Injector Fault State (No fault on injector) Powertrain relay in range Long Engine off soak period has elapsed (sec) Service Test Run/Crank is Active Engine in Cranking Phase Powertrain Relay in-Range Diag System Disable This diagnosti has already run and completed Coil Temperature Estimation Available	1.00 == FALSE == TRUE >= 28,800.00 == FALSE == TRUE == FALSE == TRUE == FALSE == FALSE == TRUE	Single decision criteria. Function 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.
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 Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	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 Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	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	> 11.00V == 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.
Cylinder Head Temperature Sensor Not Plausible (Diesel L6 ATM - LZO)	P117F	This DTC detects either a biased high or low Cylinder Head Temperature sensor. This is done by comparing the RCT sensor to two other temperature sensors 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 sensorthat is equal to: EngMetalHeadTemp Snsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number.		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: - BiasChkCylHdClntSnsr - BiasChkBlockClntSnsr - BiasChkEngInClntSnsr - BiasChkEngOutClntSnsr - BiasChkHtrCrInClntSnsr - BiasChkHtrCrOutClnSnsr - BiasChkRadOutClntSnsr - BiasChkBypInClntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk-EGRJJpStmnSnsr	OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_CylHeadMetal1_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_EngineInlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCoreInlet_CktFA EECR_HeaterCoreOutlet_CktFA EECR_RadiatorOutlet_CktFA EECR_BypassInlet_CktFA EECR_CylHeadMetal1_CktFA IAT_SensorFA HumTempSnsrFA MnfdTempSensorFA OAT_AmbientSensorFA EngOilTempFA EGRTempSensorUPSS_FA EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible >	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.
			Engine Outlet: CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng InClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng MetalSnsr Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkEng MetalSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OutClntSnsr Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrOutClnSnsr Comparison sensor 2: CeEECR_e_BiasChkEng InClntSnsr Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A:	39.00 °C 6.20 °C 33.00 °C 7.50 °C	- BiasChk_EGR_DwnStmS nsr - BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr Comparison sensors ================== The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** 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 ================= Comparison sensor 1 & 2 are not	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_BiasChkNoS election Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrEngIn ClntSnsr CeAEHR_e_BlkHtrRadO utClntSnsr > 7.40 °C >		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrlnClntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckClntSnsr Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEng OutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkOut sideAirSnsr 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	20.00 °C 7.38 °C 20.00 °C 7.61 °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 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	28,800 seconds > 28,800 seconds >-20.00 °C Enabled Enabled Disabled Disabled CeAEHR_e_BlkHtrEngIn ClntSnsr CeAEHR_e_BlkHtrEngM etalSnsr CeAEHR_e_BlkHtrRadO utClntSnsr CeAEHR_e_BlkHtrIntake AirSnsr 6.0°C 5.0°C > 15.0°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 0.5times the seconds with vehicle speed below the threshold above		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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	21.00 °C 10.68 °C >A °C >A °C >B °C >B °C	**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 A block heater is detected if a drop is	> 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrBlock ClntSnsr >-1.00L/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.
					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 OR Insufficent coolant flow is present for			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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.
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		400 failures out of 500 samples 12.5 ms / sample	Type C, 1 Trip No MIL
					Fuel Pump Driver Control Module System Voltage Low diagnostic is enabled	= 1		
					Fuel Tank Zone Module (FTZM) serial messages are available			
					Starter motor not engaged			
					Sensor Bus relay is commanded ON			
					Sensor Bus Relay FA = False	SensorBusRelayFA		

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 Sensor Bus Relay FA = False	 = 1 SensorBusRelayFA	400 failures out of 500 samples 12.5 ms / sample	Type C, 1 Trip No MIL

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 At Limit - Pressure Too Low (OBDII market only)	P131E	This monitor is used to detect any malfunction in the exhaust throttle valve performance that leads to too low pressure upstream the throttle valve itself. The diagnostic monitors, at the same time, the control saturation and the tracking error when exhaust back pressure controller is in closed loop to detect a fault. The aim of the exhaust back pressure feedback control monitor is to detect ETV/LP EGR valves leakages that lead to the ETV component control saturation and to insufficient exhaust back pressure upstream ETV itself.	Exhaust back pressure control is in saturation AND Exhaust back pressure tracking error: difference between the ETV upstream pressure requested (set point) and the estimated ETV upstream pressure	==TRUE > (**P131E: Closed Loop Exhaust pressure too low threshold** [mg] X **P131E: Closed Loop Exhaust pressure too low correction**)	Exhaust pressure diagnostic when ETV upstream pressure controller is in closed loop enabled by calibration Engine Running Cranking ignition in range PT Relay voltage in range Air Control is Active (air control in closed loop) 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 Desired ETV upstream	I.00==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > II.00 [V] Refer to "Air Control Active" Free Form TRUE if <= 4.00 [rpm], FALSE if > 8.00 [rpm] > 25.00 [counts] TRUE if <= 0.10 [mm^3], FALSE if > 0.50 [mm^3] > 25.00 [counts] >	330.00 fail counters over 520.00 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.
					pressure Desired fuel quantity	**P131E: Desired Exhaust Backpressure Enable** [kPa] > **P131E: Closed Loop Exhaust pressure too low Min fuel enabling condition** [mm^{A}3] AND < **P131E: Closed Loop Exhaust pressure too low Max fuel enabling condition** [mm^{A}3]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
NOx Catalyst Efficiency Below Threshold During Particulate Filter Regeneration Bank 1 Catalyst 2 - EWMA Enabled	P134B	The diagnosis checks if there is a malfunction in the Underfloor SCR (UF SCR, or SCR2) catalyst by measuring its capability to store NH3 and to convert NOx during a DPF regeneration, to be robust enough against both gain than offset on both NOx sensors, with any level of aging for the catalysts. The monitor is based on two NOx sensors (upstream & downstream SCR2, also defined as N0x#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 r|_Eff_SCR2_Msrd = 1 - U NOx SCR2 Dwn Msr d / J	Measured SCR2 efficiency (q_Eff_SCR2_Msrd) lower than 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; DEF system ready to inject; Urea inside the tank not frozen; Debounce time elapsed after DEF defrost has been completed; Tank partially frozen and able to inject the maximum injection quantity; Debounce time elapsed after DEF partially frozen; DEF strategy for emission reduction not inhibited in case of a DPF clogging, only for emergency vehicles; Upstream SCR2 NOx sensor measurement reliable; Downstream SCR2 NOx sensor measurement reliable; Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (SCR2 catalyst de-greened); SCR service bay test not active; Debounce time elapsed after exiting from SCR	1.00 # NOX_Snsr2_NOx_Flt # NOX_Snsr3_NOx_Flt # EGT_TempSCR2_UpFlt # EGP_PresSCR2_UpFlt ≠ EXF_TotExhSCR2_UpFlt # SCR_RDP_Flt # SCR_TipStuckFltSt # SCR_DEFMV_FA ≠ SCR_ChemicalMdlFlt_SCR2 ; NotDsbl = True [Boolean]; NotRun = True [Boolean]; DEF ready = True [Boolean]; DEF tank status = DEF_TankNotFrozen [Enumerative]; Debounce = 0 [s]; DEF tank status = DEF_TankPartiallyFrozen [Enumerative]; Debounce = 0 [s]; No Emiss DEF strategy = True [Boolean]; Reliable = True [Boolean]; Reliable = True [Boolean]; DPF Rgn Compt > 1 [-]; Service Bay Test == ServNotRunning [Enumerative]; Debounce = 0 [s]; OAT > -20 [°C]; -21 [°C] < hysteresis range < -20 [°C] Pressure > 72 [kPa]; 70 [°C] < hysteresis range < 72 [°C]	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.
		NOx_SCR1_Up_Msrd] - Reference efficiency is evaluated as q_Eff_SCR2_Ref = 1 - [f NOx_SCR2_Dwn_Ref/ f NOx_SCR1_Up_Msrd] NOx_SCR2_Dwn_Ref is calculated as NOx_SCR2_Dwn_Ref = NOx_SCR2_Up_Msrd * offset The offset **(k_Offset_RGN_SCR2**) is calibrated in order to detect a malfunction. Test is performed when NOx+NH3 integral upstream SCR2 reaches 1,000.00 [mg]. Use this section if EWMA filter is enabled (1.00 == 1 [Boolean]).			service bay test; Outside ambient temperature higher than calibration with hysteresis; Ambient pressure higher than calibration with hysteresis; SCR1 average temperature in range; Debounce time elapsed after SCR1 average temperature is in range; 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]); Debounce time elapsed after condition based on difference between SCR2 upstream and downstream temperature is met; Exhaust mass flow 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	450.00 [°C] < SCR1 mean temperature < 700 [°C]; Debounce = 5 [s]; SCR2 up/down diff temperature > **T_MinTempGrad_RGN_SCR2** [°C] SCR2 up/down diff temperature < **T_MaxTempGrad_RGN_SCR2** [°C]; Debounce = 5 [s]; **K_EffExhFlowCond_RGN_SCR2** > 1 H; Debounce = 2 [s];-5 < Delta temperature < 5 [°C/s]; Debounce = **t_DerTempDsblTmr_RGN_SCR2** [s]; SCR2 NOx up flow < 100 [mg/s]; SCR2 NOx up flow > 0 [mg/s]; SCR2 NOx up > 250 [ppm]; SCR2 NOx up < 1,000 [ppm]; Delta SCR2 NOx up flow < 60 [mg/s^2]; Debounce = 1 [s]; Debounce = 15.00 [s] f NOx_SCR2Up >		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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; Upstream SCR2 NOx flow measurement lower than calibration; Upstream SCR2 NOx flow measurement higher than calibration; Upstream SCR2 NOx sensor measurement higher than calibration; Upstream SCR2 NOx sensor measurement lower than calibration; Upstream SCR2 absolute	**m_SlipNOxIntglThrsh_RGN_SCR2** [mg]; Cmb # KaSCRR_b_MontrCombModeRGN_SCR2 [Enumerative]; SCR2 NH3 storage > **m_NH3_StrgMin_RGN_SCR2** [g]; SCR2 NH3 storage (if catalyst is degreened) < **mN H3_StrgMax_RGN_SCR2** [g]; SCR2 NH3 storage (if catalyst is aged) < **mN H3_StrgMaxAge_RGN_SCR2** [g]; interpolation for medium aging levels; Debounce = 1 [s]; Dos = PCS_Dosing| PCS_RemedialAction [Enumerative]; Debounce = 10 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					NOx flow derivative lower than calibration; Debounce time elapsed when all NOx conditions become true; 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]); Specific combustion modes not active; Debounce time elapsed after exiting from specific combustion modes; 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); Debounce time elapsed after conditions based on SCR2 NH3 storage level			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					are met; SCR dosing in PCS Dosing or PCS_RemedialAction; Debounce time elapsed afetr switching to PCS Dosing or PCS_Remedial Action;			

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Reductant Injection Valve Supply Circuit Low Bank 1 Unit 2	P138D	This diagnosis verifies if an high side short to ground occurred for the DEF Metering Valve 2	HWIO interface DEFMV2_ENABLE_GROUND_SHORT = Fault	VeHWI0_e_DEFMV2_Enbl_Gsht == CeSCRR_e_Fault	Test enabled by calibration Powertrain Relay is ON Engine is not cranking Battery voltage HWIO interface DEFMV2_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 Circuit High Bank 1 Unit 2	P138E	This diagnosis verifies if an high side short to power occurred for the DEF Metering Valve 2	HWIO interface DEFMV2_ENABLE_POWER_SHORT = Fault	VeHWI0_e_DEFMV2_Enbl_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV2_ENABLE_POWER_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.
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	1.00==TRUE ==TRUE Battery voltage > 11.00 [V] Powertrain relay voltage > 11.00 [V] Refer to "Air Control Active" Free Form >0.03 [s] > 0 [%] ==TRUE > 30.00 [°C] ==TRUE < 129.00 [°C] > 75.00 [%]	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 (Rea-ReaOld)	TRUE if > 1.40 [mg], FALSE if < 0.50 [mal		

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	<= 45.00 [count]		
					HP EGR valve total mass error (desired HP EGR mass - estimated HP EGR mass) in range, with hysteresis	TRUE if > 6.00 [mg], FALSE if < 3.00 [mg]		
					Desired HP EGR rate	> 7.00 [%]		
					HP EGR valve position OR it is above that threshold for a time	<= 55.00 [%] >=0.03 [s]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal HP EGR valve total flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		
					Nominal LP EGR valve total flow is valid	LPE_VlvTotFlowNomNotVld ==FALSE		
					All enabling conditions last for a time	>= 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	>0.03 [s]		
					Desired EGR rate	> 0 [%]		
					No active transition from a combustion mode to another one	==TRUE		
					(Engine Coolant Temperature	> 30.00 [°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.
					Throttle measured position	> 75.00 [%]		
					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	> -1.55 [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 > -1.00 [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 < -32.00 [mg], FALSE if > -12.00 [mg]		
					Desired HP EGR rate	< 55.00 [%]		
					Exhaust manifold pressure is valid	EXM_ExhMnfdPresNotVld ==FALSE		
					Nominal HP EGR valve total flow is valid	EGR_VlvTotFlowNomNotVld ==FALSE		
					Nominal LP EGR valve total flow is valid	LPE_VlvTotFlowNomNotVld ==FALSE		
					All enabling conditions last for a time	> 0.05 [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	Monitor Enable Condition AND Engine soak (not run) time AND Engine Mode Cranking AND Run Crank Low Time Error AND Rational Sensor Comparator Fault Active AND Differential ECT Condition Detected AND Diagnostic System Disabled Ambient Temperature	1.00 ==TRUE >= 28,800.00 == FALSE == FALSE == FALSE == FALSE == FALSE >-20.00 0.00 == FALSE	Function Task: 100 ms /sample, continuousNA	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					with hysteresis AND Rational Fault Condition Met Trip AND Block Heater Detected AND Sensor Circuit Fault Active	 == FALSE == FALSE		

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 - LZO)	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 sensorthat is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoIlseAssg nmnt Temperature Sensor 5: CeEECR_e_NoIlseAssg nmnt Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number.		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: - BiasChkCylHdClntSnsr - BiasChkBlockClntSnsr - BiasChkEngInClntSnsr - BiasChkEngOutClntSnsr - BiasChkHtrCrInClntSnsr - BiasChkHtrCrOutClnSnsr - BiasChkRadOutClntSnsr - BiasChkBypInClntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk-EGRJJpStmnSn sr - BiasChk_EGR_DwnStmS	 OAT_PtEstFiltFA PSAR_PropSysInactveCr s_FA = FALSE EECR_TS2_CktFA EECR_CylHeadCoolant_ CktFA EECR_BlockCoolant_Ckt FA EECR_EngineInlet_CktFA EECR_EngineOutlet_Ckt FA EECR_HeaterCore1nlet_C ktFA EECR_HeaterCoreOutlet _CktFA EECR_RadiatorOutlet_Ck tFA EECR_BypassInlet_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.
			Engine Outlet: CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng InClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng MetalSnsr Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkEng MetalSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OutClntSnsr Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrOutClnSnsr Comparison sensor 2: CeEECR_e_BiasChkEng InClntSnsr Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A: Threshold B:	39.00 °C 6.20 °C 33.00 °C 7.50 °C 20.00 °C 7.38 °C	nsr - BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr Comparison sensors ================= The following thresholds are based on the sensor under diagnosis **Engine Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** 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 ================ Comparison sensor 1 & 2 are not	EGRTempSensorDNSS_F A 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 = CeEECR_e_BiasChkNoS election		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Heater Outlet: CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkHtr CrInCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkBlo ckCIntSnsr Block Heater: CeEECR_e_AuxHeaterN oEffect Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEng OutCIntSnsr Comparison sensor 2: CeEECR_e_BiasChkOut sideAirSnsr 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	20.00 °C 7.61 °C 21.00 °C 10.68 °C >A °C >A °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 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:**	Same set as listed above and EngineModeNotRunTimer Error EngineModeNotRunTimer _FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrEngIn CIntSnsr CeAEHR_e_BlkHtrRadO utCIntSnsr >7.40 °C >28,800 seconds >28,800 seconds >-20.00 °C Enabled Enabled Disabled Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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	>B°C >B°C	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 A block heater is detected if a drop is **IAT Drop Criteria:** The	CeAEHR_e_BlkHtrEngInClntSnsr CeAEHR_e_BlkHtrEngMetalSnsr CeAEHR_e_BlkHtrRadOutClntSnsr CeAEHR_e_BlkHtrIntakeAirSnsr 6.0°C 5.0°C >15.0 °C CeAEHR_e_BlkHtrBlockClntSnsr >87.00 L/min 0.1 - 17.0 seconds <77.0 seconds >1.8 °C CeAEHR_e_BlkHtrIntakeAirSnsr		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 OR Insufficent coolant flow is present for Derivative count will increment if derivative is	>5.0°C >400.0 seconds >24.0kph 0.5times the seconds with vehicle speed below the threshold above > 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrBlock ClntSnsr >-1.00L/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.
					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.
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 fulfilll 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	> 0.03 [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	> 60.00 [°C] ==TRUE < 129.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust Throttle measured position	> 61.00 [%]		
					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|)	< 101.00 [mg]		
					Desired fuel quantity in range	> **P14A5: Increasing LP EGR slow response Min fuel enabling condition** [mm^3] AND < **P14A5: Increasing LP EGR slow response Max fuel enabling condition** [mm^3]		
					LP EGR differential pressure in range	>0.10 [kPa] AND < 3.50 [kPa]		
					Desired LP EGR flow gradient (Req-ReqOld) lower than a threshold	<4.10 [mg/s]		
					Desired LP EGR flow gradient (Rea-ReaOld)	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	> 2.50 [mg], FALSE if < 0.20 [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 > 4.00 [mg], FALSE if < 1.00 [mg]		
					Desired LP EGR rate	> 10.00 [%]		
					LP EGR valve position OR it is above that threshold for a time	<= 60.00 [%] >= 0.03 [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_VlvTotFlowNomNotV ld ==FALSE		
					All enabling conditions last for a time	>= 0.03 [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 fulfilll 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 > 0.03 [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	> 61.00 [%]		
					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|)	< 101.00 [mg]		
					Desired fuel quantity in range	> **P14A6: Decreasing LP EGR slow response Min fuel enabling condition** [mm^{A}3] AND < **P14A6: Decreasing LP EGR slow response Max fuel enabling condition** [mm^{A}3]		
					LP EGR differential pressure in range	> 0.30 [kPa] AND < 2.80 [kPa]		
					Desired LP EGR flow gradient (Req-ReqOld) greater than a threshold	> -6.00 [mg/s]		
					Desired LP EGR flow gradient (Rea-ReaOld)	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 Hysteresis lasts for a limited number of samples LP EGR valve total mass error (desired LP EGR mass - estimated LP EGR mass) in range, with hysteresis Desired LP EGR rate No fault on Exhaust throttle valve position sensor HP EGR valve total flow is valid Nominal LP EGR valve total flow is valid All enabling conditions last for a time	< -2.50 [mg], FALSE if > 1.00 [mg] <= 14.00 [count] TRUE if < -50.00 [mg], FALSE if > -7.00 [mg] < 8.00 [%] LEV_PstnSnsrFA ==FALSE EGR_VlvTotFlowNotValid ==FALSE LPE_VlvTotFlowNomNotV ld ==FALSE >= 0.03 [s]		

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.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Circuit Low	P15CC	This monitor refers to electrical fails on the differential pressure temperature information, covering the out of range low. The monitor compares the raw temperature signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Differential pressure sensor Temperature information	<-1,000.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	0.00 ==TRUE ==TRUE ==FALSE ==FALSE	65,535.00 fail samples out of 0.00 samples 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.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Circuit High	P15CD	This monitor refers to electrical fails on the differential pressure temperature information sensor, covering the out of range high. The monitor compares the raw temperature signal with a maximum threshold. If this threshold is overcome, an open circuit or a short circuit to battery is detected.	Differential pressure sensor Temperature information	>1,000.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	0.00 ==TRUE ==TRUE ==FALSE ==FALSE	65,535.00 fail samples out of 0.00 samples 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.
Bank 1 Sensor 1 DPS "A" Temperature Sensor Intermittent	P15CE	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent differential pressure temperature information samples exceeds a certain threshold	>1,000.00 [°C]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags for the differencial pressure temperature information (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on differential pressure temperature information (out of range high/low, loss of communication in case of digital sensor)	0.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DPST_CktFlt	65,535.00 fail samples out of 0.00 samples 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.
Bank 1 Sensor 1 DPS A Temperature Sensor Key on Test	P15CF	This monitor checks if the raw signal is affected by offset issue comparing a measured DPS temperature at key on with a average temperature calculated at key on.	Difference between the average temperature calculated at key one the DPS measured temperature shall be greater than in case block heater is not detected instead shall be greater than in case the Block heater is detected	>0.00 [°C] >0.00 [°C]	Monitor enabled by dedicated calibration AND Ambient temperature greater than a calibratable threshold with hysteresis AND Diagnostic system reset status AND Electrical errors flags for the differential pressure temperature information (out of range high/ low,intermittent and loss of communication in case of digital sensor) AND Average temperature calculation valid AND Run Cranck Ignition in Range AND No electrical fault on	0.00 [Boolean] >-1,000.00 0.00 ==FALSE == FALSE ==TRUE ==TRUE DPST_CktFlt	255.00 fail samples out of 0.00 samples 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.
					differential temperature information(out of range high/low, intermittent and loss of communication in case of digital sensor) Key on report done	 ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Circuit Low	P15D4	This monitor refers to electrical fails on the downstream relative pressure temperature information, covering the out of range low. The monitor compares the raw temperature signal with a minimum threshold. If this threshold is overcome, a short circuit to GND is detected.	Downstream relative pressure sensor Temperature information	<-1,000.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	0.00 ==TRUE ==TRUE ==FALSE ==FALSE	65,535.00 fail samples out of 0.00 samples 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.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Circuit High	P15D5	This monitor refers to electrical fails on the downstream relative pressure temperature information sensor, covering the out of range high. The monitor compares the raw temperature signal with a maximum threshold. If this threshold is overcome, an open circuit or a short circuit to battery is detected.	Downstream relative pressure sensor Temperature information	>1,000.00	Monitor enabled by calibration Run Cranck Active Run Crank Igntion in Range Diagnostic system reset status Engine in Crank Mode	0.00 ==TRUE ==TRUE ==FALSE ==FALSE	65,535.00 fail samples out of 0.00 samples 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.
Bank 1 Sensor 2 DRS "C" Temperature Sensor Intermittent	P15D6	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent downstream relative pressure temperature information samples exceeds a certain threshold	>1,000.00 [°C]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags for the downstream relative pressure temperature information (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on downstream relative pressure temperature information(out of range high/low, loss of communication in case of digital sensor)	0.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DRST_CktFlt	65,535.00 fail samples out of 0.00 samples 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.
Bank 1 Sensor 2 DRS C Temperature Sensor Key on Test	P15D7	This monitor checks if the raw signal is affected by offset issue comparing a measured DRS temperature at key on with a average temperature calculated at key on.	Difference between the average temperature calculated at key one the DRS measured temperature shall be greater than in case block heater is not detected instead shall be greater than a calibratalble value in case the Block heater is detected	>0.00 [°C] >0.00 [°C]	Monitor enabled by dedicated calibration AND Ambient temperature greater than a calibratable threshold with hysteresis AND Diagnostic system reset status AND Electrical errors flags for the downstream relative pressure temperature information (out of range high/low,intermittent and loss of communication in case of digital sensor) AND Average temperature calculation valid AND Run Cranck Ignition in Range AND No electrical fault on	0.00 [Boolean] >-1,000.00 0.00 ==FALSE == FALSE ==TRUE ==TRUE DRST_CktFlt	255.00 fail samples out of 0.00 samples 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.
					downstream relative pressure temperature information(out of range high/low, intermittent and loss of communication in case of digital sensor) Key on report done	==FALSE		

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	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 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	>2.50A <0.05A	Powertrain relay voltage FHP_PR_ElecIFltStatus LS driver (Enable driver) discrete output electrical interface is not driven OFF PWM output signal is driven (different from zero).	> 11.0V == FALSE	121.00 failures out of 242.00 samples 6.25 ms/sample	Type C, 1 Trip No MIL
			(Pressure regulator current deviation AND Commanded Duty Cycle OR (Pressure regulator current deviation AND Commanded Duty Cycle	> 0.15 >= 95.00) < -0.10 <= 5.00)	Powertrain relay voltage FHP_PR_ElecIFltStatus PR Current Governor Enabled	> 11.0V == FALSE == TRUE	121.00 failures out of 242.00 samples 6.25 ms/sample	

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	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	Sensor Bus relay circuit open diagnostic = TRUE Run/Crank Voltage	1.00 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	Sensor Bus relay circuit short to ground diagnostic = TRUE Run/Crank Voltage	1.00 Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 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	Sensor Bus relay circuit short to power diagnostic = TRUE Run/Crank Voltage	1.00 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	= True =False =False =True = True =True =Park =False	200, 200, 200,2,050, 200 or 200 msec, depending on conditions. T1 = 200 msec T2 = 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.
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	= Valid Range = Not running	1,500 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Current Transmissio n 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	= Valid =False =False =True = True =True =Park =False	80 failures out of 100 samples 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.
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			16 Failures out of 20 Samples (5 msec loop)	Type C, 1 Trip 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			16 Failures out of 20 Samples (5 msec loop)	Type C, 1 Trip 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	P17A4, P17A3	100 Failures out of 120 Samples =500 msec (5 msec loop)	Type C, 1 Trip 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:	1.00 =0.05 seconds	12.5 ms rate 24,000.00 failures out of 24,000.00 samples	Type C, 1 Trip 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			16 Failures out of 20 Samples (5 msec loop)	Type C, 1 Trip 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			16 Failures out of 20 Samples (5 msec loop)	Type C, 1 Trip 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	P17A8, P17A7	100 Failures out of 120 Samples =500 msec (5 msec loop)	Type C, 1 Trip No MIL

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	Run or Run/Crank ON	[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, 1 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 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:	Run or Run/Crank ON	[1] 1 failure Frequency: Once at power-up [2] 1 failure Frequency: Runs continuously in the background	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 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	Run or Run/Crank ON	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, 1 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 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	For all six cases: Run or Run/Crank OR ON	[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 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 Ignition On/ Start Switch Circuit Low	P17E0	Detects if the Ignitionl 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, 2 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 Ignition On/ Start Switch Circuit High	P17E1	Detects if the Ignitionl Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Engine Controller Run Crank Terminal Status - CAN Message	= 0, indicating NOT RUN/CRANK	8 sec in 10 second window	Type B, 2 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 On	P17F3	Checks if both Park switches are stuck closed	Both Park Switches are PRESSED	> 1.00 seconds	Not Fault Active Controller is "on"	P07B3, P07B4, P07B4, P07B9, P07BA, P07BB >~ 100 ms	4,800.00 failures out of 6,000.00 samples	Type B, 2 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/B Circuit Stuck On	P17F4	Checks if enable switch is stuck pressed.	Enable Switch A or B are PRESSED	> 1.00 seconds	Enabled via calibration Controller is	1.00 "On"	24,000.00 failures out of 30,000.00 samples	Type C, 1 Trip No MIL

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:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 . =True*	This is based on the number of button and switch activation, not time. *note: these samples can accumulate over key-cycles	Type B, 2 Trips
			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:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd, calibrated with a hysteresis loop: 8.00 and 7.50 . =True*	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.
Transmission Range Command Correlation	P1911	Detects if Range Command Echo from TCM matches current Range Command	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	= TRUE = FALSE = FALSE	80 failures out of 100 samples 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.
Reductant Injection Valve Bank 1 Unit 2 Temperature /Exhaust Gas Temperature Not Plausible	P1C30	This monitor measures the coil temperature of the second DEF injector, and compare it to with reference temperature after long soak.	Difference between coil temperature and reference temperature greater than calibratable value.	> **P1C30_CoilTemp2RatTempRef**	Test enabled by calibration DEF Injector Fault State (No fault on injector) Long Engine off soak period has elapsed (sec) Service Test Run/Crank is Active Engine in Cranking Phase Powertrain Relay Voltage in Range This diagnosti has already run and completed Coil Temperature Estimation Available	1.00 SCR_DEFMV2_FltSt >= 28,800.00 == FALSE == TRUE == FALSE == TRUE == FALSE == TRUE	Single decision criteria. Function 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.
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 DEFMVJDPEN 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.
Reductant Injection Valve Circuit/ Open Bank 1 Unit 2	P2053	This diagnosis verifies if an open circuit occurred for the DEF Metering Valve 2	HWIO interface DEFMV2_OPEN = Fault	VeHWI0_e_DEFMV2_Open == CeSCRR_e_Fault	Test enabled by calibration	1.00	30.00 failures out of 60.00 samples Time basis = 100ms	Type A, 1 Trips
					Key on (OR engine running)			
					Engine is not cranking			
					Battery voltage	>11.00 [V]		
					HWIO interface DEFMV2_OPEN different from INDETERMINATE			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injection Valve Circuit Low Bank 1 Unit 2	P2054	This diagnosis verifies if a low side short to ground occurred for the DEF Metering Valve 2	HWIO interface DEFMV2_GROUND_SHORT = Fault	VeHWI0_e_DEFMV2_Gsht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV2_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 Injection Valve Circuit High Bank 1 Unit 2	P2055	This diagnosis verifies if a low side short to battery occurred for the DEF Metering Valve 2	HWIO interface DEFMV2_POWER_SHORT = Fault	VeHWI0_e_DEFMV2_Psht == CeSCRR_e_Fault	Test enabled by calibration Key on (OR engine running) Engine is not cranking Battery voltage HWIO interface DEFMV2_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.
SCR1 Plouton NOx Conversion Efficiency Monitor - EWMA Enabled	P20EE	It detects a SCR1 catalyst malfunction when its NOx conversion capability decreases to the point that emissions exceed OBD emissions threshold. SCR1 Plouton NOx conversion efficiency monitoring estimates, using a model-based approach, the maximum SCR1 NH3 storage capacity (maximum amount of NH3 that the component is still able to store). The diagnostic parameter (f_avg) is an estimator of the overall deviations between the SCR1 ammonia storage capacity estimates and a nominal value in a set of valid samples. EWMA Filtering functionality (including Fast Initial Response (FIR), Rapid Response (RR) and EWMA Standard) is supported.	Check if the EWMA filtererd diagnostic parameter (f_avg) is above the: - Fail thrsh (if SCR_CatEffFA = FALSE) - Repass thrsh (if SCR_CatEffFA = TRUE)	Fail Thrsh 0.35000 Repass Thrsh 0.35000	TEST ENABLED No DTC present: Time elapsed since SCR chemical model not in fault Diagnostic system not disabled Engine running DEF system ready If DEF quality sensor present: DEF concentration Upstream SCR1 NOx sensor measurement reliable Downstream SCR1 NOx sensor measurement reliable DEF Tank state Time elapsed since DEF Tank state condition satisfied DEF Tank state	1 NOX_NOx_SnsrCatUpFlt SCR_NOxSnsrDwnFlt SCR.ThermalMdlFlt EGT_SnsrSCR_DwnFlt SCR_ExhGasVolFlowFlt SCR_RDP_FA SCR_TipStuckFltSt SCR_DEFMV_FA SCR_ChemicalMdlFlt SBR_RlyFA SCR_DEFSysFlt_IUPR_DenDsbl EXF_TotExhSCR_UpFlt EXF_TotExhCatUpFlt > 5.00s TRUE TRUE TRUE DEFQS present = 1 > 25 % (22 % <hys< 25 %) TRUE TRUE Not Frozen	The diagnostic parameter is calculated collecting and averaging 300 samples when enabling conditions are satisfied, then filtering the resuting mean value by means of EWMA filter. 250 ms/sample. FIR Gain = 0.43 TestPerTrip <= 1.00 TotTest <= 2.00 RR Gain = 0.25 TestPerTrip <= 2.00 TotTest <= 4.00 STD	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Time elapsed since DEF Tank state condition satisfied DEF strategy for emission reduction not inhibited in case of a DPF clogging, only for emergency vehicles; Number of DPF regeneration events successfully completed after vehicle exits from assembly plant SCR Service Bay test Time elapsed since SCR Service Bay test NOx Storage model Time elapsed since NOx Storage condition satisfied Conditions satisfied NOx inlet concentration in ppm Condition satisfied NOx inlet flow in g/s Condition satisfied NOx inlet gradient Time elapsed since NOx inlet conditions satisfied	> 0.00 s Partially Frozen and able to inject the maximum injection quantity > 300.00 s TRUE > 1 Not Running > 300 s <=1,111,110.00 >1,111,110.00s >-0.10 <1,500.00 < 1.00 g/s < 2,500.00 >= 35.00 s >= 210.00 °C <= 300.00 °C	Gain = 0.18 TestPerTrip <= 1	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Estimated SCR1 substrate temperature to enable the monitoring after init events condition satisfied Ambient temperature Ambient pressure SCR PCS Control Time elapsed since SCR PCS Control condition satisfied SCR1 substrate temperature Time elapsed since SCR1 substrate temperature satisfied Combustion mode Time elapsed since Combustion mode condition satisfied The estimated error variance of NH3 storage (P11)	>-20.00 °C (-21.00 °C <hys< -20.00 °C) > 72.00 kPa (70.00 kPa <hys< 72.00 kPa) PCS_Dosing PCS_RemedialAction > 5.00 s >210.00 °C <380.00 °C > 20.00 s **SCR_Eff1_CombMode_Enbl** > 300.00 s <=900.00000 <=20.00000 <=160.00000 <= 1 <= 1 <= 2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The estimated error covariance of NH3 storage and max storage capacity (P12.P21) The estimated error variance of NH3 max storage capacity (P22) Test per trip with Standard mode active Tests per trip with Fast Initial Response (FIR) mode active Tests per trip with Rapid Response (RR) mode active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Reductant Injector Performance - Low Reductant Consumptio n	P20FE	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery from 1st DEF Injector.This monitor determines when RDP compensation has achieved a compensation factor so high that the expected pressure drop does not guarantee proper reductant delivery performance.	EWMA of Reductant Delivery Perfomance Compensation Factor	> 1.45	Closed Loop of Reductant Delivery Performance Compensation active	== TRUE	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.
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. Detecta 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. Detecta 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 >	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 faulstfor# 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) >	3.500% Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or faulstfor# 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 - LZO)	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 sensorthat is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr	< X Ohms X is equal to: Temp Sensor 1: 48 Ohms Temp Sensor 2: 48.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 43.2 Ohms Temp Sensor 5: 43.2 Ohms Temp Sensor 8: 9.0 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.
Engine Coolant Temperature Sensor 2 Circuit High (Diesel L6 ATM - LZO)	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 sensorthat is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 8: CeEECR_e_EngMetalHe adTempSnsr	> X Ohms X is equal to: Temp Sensor 1: 235,000 Ohms Temp Sensor 2: 235,000 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 338,540 Ohms Temp Sensor 5: 338,540 Ohms Temp Sensor 8: 364,600 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.
Engine Coolant Temperature Sensor 2 Circuit Intermittent/ Erratic (Diesel L6 ATM - LZO)	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 sensorthat is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt		Diagnostic is Enabled No Active DTC's	 EECR_TS2_Erratic_TFTK0 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 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 Temperature Sensor 8: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading	 5.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 7.4 seconds -60.0 °C 200.0 °C 2.3 seconds -60.0 °C 150.0 °C 2.7 seconds -60.0 °C 150.0 °C 7.4 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.
			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 caluculated 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. ****************************					

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 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, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: 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] < 985.00 [rpm] < 25.00 [mm^3] > 90.00 [%] > 60.00 [°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 ECT_Sensor_FA	240.00 fail counters over 300.00 sample counters 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.
						==FALSE MAF_MAF_SnsrFA ==FALSE		
			BARO Pressure OR BARO Pressure OR 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	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	>5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 fail counters over 5 sample counters 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.
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 SBR_RlyFA	40 failure out of 80 samples 100 ms/sample	Type C, 1 Trip No MIL

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 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, P00C7: Maximum pressure difference** [kPa] > **P0106, P2227, P227B, P00C7: Maximum pressure difference** [kPa] <= **P0106, P2227, P227B, P00C7: 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] < 985.00 [rpm] < 25.00 [mm^3] > 90.00 [%] > 60.00 [°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	240.00 fail counters over 300.00 sample counters sampling time is 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.
						ECT_Sensor_FA ==FALSE MAF_MAF_SnsrFA ==FALSE		
			TCIAP Pressure OR TCIAP Pressure OR 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	< 50.0 [kPa] > 115.0 [kPa] > 10.0 [kPa] > 10.0 [kPa] <= 10.0 [kPa]	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	>5.0 [s] EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP3_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP3_SnsrCktFP	4 fail counters over 5 sample counters sampling time is 12.5ms	

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 > 15 to 270 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 >= 0 kPa) ==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 >2.0mm^3/stroke ==0.00 == False) ==0.00 >= 0 kPa) ==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	<--18.00 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 >= 0 kPa) == 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	<-18 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	>2.00mm^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	>= 0 kPa)		
					(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 Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	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 Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	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 Engine cranking Diagnosis enabled by calibration Diagnostic system disabled HWIO fault feedback different from INDETERMINATE	> 11.00V == FALSE == TRUE == FALSE	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	<27	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.
Particulate filter differential pressure too low	P244A	The monitor has the purpose of detecting whether the upstream pipe is leaking or disconnected. The monitor compares the sensed differential pressure across the particulate filter with a threshold. This threshold value is estimated as output of a map, function of the soot load estimation and the exhaust gass mass flow.	Differential Pressure Sensor Value	**<DPS_DPL_Thrsh**	Monitor enabled by dedicated calibration AND engine mode run AND Model Pipes Temperature enablement AND No fault affect Exhaust mass Flow and Soot load model AND no offset, quick change, elettrical check and DPS Too Hi, no electrical and quicke change fault attected the DPS temperature information AND Soot load inside a calibratable value with hysteresis AND	1.00 ==TRUE ==TRUE ==TRUE DPS.OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPH_Flt DPST_CktFlt DPST_QckChgFlt <1,000.00 >0.00 2.00	30.00 fail samples out of 50.00 samples 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.
						<60.00		
					Exhaust FLow lower than a calibratable with hysteresis	5.00		
					AND	>100.00 <-1.00		
					Exhaust vallve 1 inside a calibratable range with hysteresis	5.00 >100.00 <-1.00		
					AND	5.00		
					Exhaust vallve 2 inside a calibratable range with hysteresis			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Filter differential pressure too high	P244B	The monitor has the purpose of detecting whether the downstream pipe is leaking or disconnected. This monitor has two differerent concepts, depending on the available hardware (sensor type). If the sensor supports the reading of the downstream filter relative to ambient pressure, the diagnostic compares this value with a threshold (DRS concept). Otherwise, the monitor compares the ratio between the sensed differential pressure across the filter and the exhaust gas mass flow with a threshold value. This threshold value is estimated as output of a map, function of the soot load estimation and the upstream filter sensed temparature. The ratio used as test parameter is calculated over a time window, whose value is calibratable (DPS concept).	in case: 0.00 Differential Pressure Sensor moving average else Differential Pressure Sensor moving average	==1 >AvrThrshAvg_calculated > **DPS_DPHD_RatioThrsh**	Monitor enabled by dedicated calibration Monitore enable for Downstream Too high set to False AND engine mode run AND Model Pipes Temperature enable AND No fault affect Exhaust mass Flow and Soot load model AND no offset, quick change, electrical check and DPS Too Low,no electrical and quick change of the DPST temperature fault No fault on Temperature upstream the Filter AND No fault Exhaust Back Pressure measured position	1.00 1.00 ==TRUE ==TRUE =TRUE DPS.OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPL_Flt DPST_CktFlt DPST_QckChgFlt EGT_SnsrCatUpFlt ==TRUE	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.
					AND Exhaust Back Pressure measured position inside a calibratable value with hysteresis AND Soot load inside a calibratable value with hysteresis AND The Temperature Upstream the filter inside a calibratable range with hysteresis AND Exhaust flow lower than a calibratable value with hysteresis and shall ne evaluated after a calibratable time AND Exhaust vallve flap 1 inside a calibratable range with hysteresis AND	>100.00 <0.00 5.00 <90.00 >0.00 2.00 <500.00 >200.00 10.00 <60.00 5.00 0.00 >100.00 < -1.00 >100.00 <-1.00 5.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Exhaust vallve flap 2 inside a calibratable range with hysteresis			
			Downstream relative pressure	<0.18	Monitor enabled by dedicated calibration	1.00	30.00 fail samples out of 50.00 samples	
					Monitore enable for DRS Too high monitor set to True	1.00	Function task: 12.5 ms	
					AND			
					engine mode run AND	==TRUE		
					Model Pipes Temperature enable	==TRUE		
					AND			
					No fault affect Exhaust mass Flow	==TRUE		
					AND			
					no DRS offset fault, no DRS quick change fault, no DRS elettica check fault and DPS Too low fault, no DRS temperature quick change fault, no DRS temperature electrical fault .	DRS.OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPS_DPL_Flt DRST_CktFlt DRST_QckChgFlt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND			
					no fault Exhaust Back Pressure measured position	==TRUE		
					AND			
					Exhaust Back Pressure measured position inside a calibratable value with hysteresis	>100.00 <0.00 5.00		
					AND			
					Exhaust mass Flow with hysteresis and shall ne evaluated after a calibratable time	<60.00 5.00 0.00		
					AND	>100.00 <-1.00		
					Exhaust vallve flap 1 inside a calibratable range with hysteresis	5.00 >100.00 <-1.00 5.00		
					AND			
					Exhaust vallve flap 2 inside a calibratable range with hysteresis	>1,000.00 0.00 >1,000.00 0.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND Ambiente pressure greater than a claibratable value with hysteresis AND DRS temperature information greater tha a calibratable threshold with hysteresis			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Differential pressure sensor offset rationality	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).	the absoulute difference between the Offset Differential value and the calibratabe offset Nominal vallue(4.71)	>2.20 [%]	Monitor enabled by dedicated calibration	1.00 [Boolean]	No debounce	Type A, 1 Trips
					AND			
					DPS offset learn completed	==TRUE	Function task: 12.5 ms	
					AND			
					Model Pipes Temperature enablement	==TRUE		
					AND			
					Offeset Report Done	==FALSE		
					No DPS electrical fault, no DPS stuck fault or no DPS quick change faults,no DPS Temperature fault, no DPS Temperature quick chenage fault, no enge not run fault	DPS_CktFlt DPS_QckChgFlt DPS_StkFlt DPST_CktFlt DPST_QckChgFlt EngineModeNotRunTimer_FA		

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	P2453	This monitor detects a stuck signal, reporting a failure if the signal does not change when it is expecteded to (during transient phases).	Differential pressure variation lower than expected	<= 0.08 [%]	Monitor enabled by dedicated calibration AND Engine movement detection AND Model Pipes Temperature enable AND No electrical, plausibility, offset and quick change faults affecting the sensors, no DPS temperature electrical fault, no DPS quick change Temperature fault. AND Engine speed variation AND Fuel quantity variation AND Minimum air flow variation value	1.00 [Boolean] == TRUE ==TRUE DPS.OfstTFTKO DPS_QckChgFlt DPS_CktFlt DPST_CktFlt DPST_QckChgFlt >110.00 [rpm/s] >4.50 [l/s] >220.00	40.00 fail samples out of 50.00 samples 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.
Differential pressure sensor out of range low	P2454	This monitor refers to electrical fails on the 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.	<0.02 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 samples 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.
Differential pressure sensor out of range 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 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.	> 99.80 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE =FALSE ==FALSE	158.00 fail samples out of 200.00 samples 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.
Differential pressure sensor quick change	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 AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on exhaust gas pressure sensor (out of range high/ low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DPS_CktFlt	99.00 fail samples out of 200.00 samples 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.
Closed Loop Reductant Injection Control At Limit - Flow Too Low, PCS	P249D	Monitoring detects when the DEF injection is too low to reach the target. The following parameters: - the SCR# EKF coverage ratio; - the difference between the SCR# model and EKF coverage ratios; are checked and compared with specific thresholds. Monitoring reports the **failure:** - If **any** SCR catalysts/ bricks **fulfill all** Malfunction Criteria; - With PTC active, if **any** SCR catalysts/ bricks **fulfill any** Malfunction Criteria (with dedicated repass thresholds). Monitoring reports the **pass:** - If **none of** the SCR catalysts/bricks **fulfill all** Malfunction Criteria; - With PTC active, if **all** SCR catalysts/bricks **do not fulfill any** Malfunction Criteria (with dedicated repass thresholds).	SCR1 EKF coverage ratio SCR1 "model - EKF" coverage ratios SCR2 EKF coverage ratio SCR2 "model - EKF" coverage ratios	< 0.010 **(With DTC Active:** < 0.020) > 0.400 **(With DTC Active:** > 0.200) < 0.005 **(With DTC Active:** < 0.010) > 0.400 **(With DTC Active:** >0.200)	CAL ENABLER a) No SCR1 chemical model faults b) No SCR2 chemical model faults c) No DEF1 electrical faults d) No DEF2 electrical faults e) No DEF Component management faults Conditions a), b), c), d), e) fulfilled for a period of time Diagnostic System Code Clear Requested Diagnostic System Reset Complete f) SCR1 substrate temperature g) SCR2 substrate temperature Conditions f) and g) fulfilled for a period of time h) SCR1 Dosing Status	1 = TRUE; SCR_ChemicalMdlFlt_SCR = FALSE; SCR_ChemicalMdlFlt_SCR2 = FALSE; SCR_DEFMV_FA = FALSE; SCR_DEFMV2_FA = FALSE; SCR_DEFSysFlt_IUPR_DenDsbl = FALSE; >= 10.00 [s]; = FALSE; = TRUE; >= 210.00 [°C]; <= 300.00 [°C]; >= 210.00 [°C]; <= 300.00 [°C]; >= 3.00 [s]; = PCS_DOSING; = PCS_DOSING;	Monitoring provides the Report only if Malfunction Criteria are verified (or not) for a time equal or greater to 60.00 [s].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Architectures: - For single SCR applications, all conditions related to SCR2 are neglected; - For single SCR applications, with an SCR dual brick model, all conditions related to SCR1 and SCR2 refer to Brickl and Brick2 respectively; - For single DEF applications, all conditions related to DEF2 are neglected.			i) SCR2 Dosing Status j) SCR1 EKF correction active k) SCR2 EKF correction active Conditions h), i), j) and k) fulfilled for a period of time l) RDP test run request Condition l) fulfilled for a period of time	= TRUE; = TRUE; >= 10.00 [s]; = FALSE; >= 10.00 [s];		

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 High, PCS	P249E	Monitoring detects when the DEF injection is too high to reach the target. The following parameters: - the SCR# EKF coverage ratio; - the difference between the SCR# model and EKF coverage ratios; are checked and compared with specific thresholds. Monitoring reports the failure: - If **any** SCR catalysts/ bricks **fulfill all** Malfunction Criteria; - <u>With PTC active</u>, if **any** SCR catalysts/ bricks **fulfill any** Malfunction Criteria (with dedicated repass thresholds). Monitoring reports the pass: - If **none of** the SCR catalysts/bricks **fulfill all** Malfunction Criteria; - <u>With PTC active</u>, if **all** SCR catalysts/bricks **do not fulfill any** Malfunction Criteria (with dedicated repass thresholds).	SCR1 EKF coverage ratio SCR1 "EKF - model" coverage ratios SCR2 EKF coverage ratio SCR2 "EKF - model" coverage ratios	> 0.850 **(With DTC Active:** > 0.800) > 0.400 **(With DTC Active:** > 0.200) > 0.850 **(With DTC Active:** > 0.800) > 0.400 **(With DTC Active:** > 0.200)	CAL ENABLER a) No SCR1 chemical model faults b) No SCR2 chemical model faults c) No DEF1 electrical faults d) No DEF2 electrical faults e) No DEF Component management faults Conditions a), b), c), d), e) fulfilled for a period of time Diagnostic System Code Clear Requested Diagnostic System Reset Complete f) SCR1 substrate temperature g) SCR2 substrate temperature Conditions f) and g) fulfilled for a period of time h) SCR1 Dosing Status	1 = TRUE; SCR_ChemicalMdlFlt_SCR = FALSE; SCR_ChemicalMdlFlt_SCR2 = FALSE; SCR_DEFMV_FA = FALSE; SCR_DEFMV2_FA = FALSE; SCR_DEFSysFlt_IUPR_DenDsbl = FALSE; >= 10.00 [s]; = FALSE; = TRUE; >= 210.00 [°C]; <= 300.00 [°C]; >= 210.00 [°C]; <= 300.00 [°C]; >= 3.00 [s]; = PCS_DOSING; = PCS_DOSING;	Monitoring provides the Report only if Malfunction Criteria are verified (or not) for a time equal or greater to 60.00 [s].	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Architectures: - For single SCR applications, all conditions related to SCR2 are neglected; - For single SCR applications, with an SCR dual brick model, all conditions related to SCR1 and SCR2 refer to Brickl and Brick2 respectively; - For single DEF applications, all conditions related to DEF2 are neglected.			i) SCR2 Dosing Status j) SCR1 EKF correction active k) SCR2 EKF correction active Conditions h), i), j) and k) fulfilled for a period of time l) RDP test run request Condition l) fulfilled for a period of time	= TRUE; = TRUE; >= 10.00 [s]; = FALSE; >= 10.00 [s];		

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	>= 3,100.00 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 >= 2.00 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.
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 Desired Position Gradient is stable 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 = Active = Inactive = Inactive = TRUE = Inactive = Enabled = True = True >-20.0 °C = TRUE	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.
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_TFTK 0 == False	80.00 fails out of 100.00 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	80.00 fails out of 100.00 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	80.00 fails out of 100.00 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 Supply Circuit 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	80.00 fails out of 100.00 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	80.00 fails out of 100.00 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	80.00 fails out of 100.00 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	== 1.00	160.00 fails out of 200.00 samples Sampling rate: 6.25 ms	Type B, 2 Trips
					Diagnostic system enabled	== True		
					Engine cranking	== False		
					Powertrain relay voltage	> 11.00 [V]		
					Desired position rate of change AND	> -30.00		
					Desired position rate of change AND	< 30.00		
					Time since rate of change is in range	> 2.50		
					Closed-loop position contro active	== True		
					Engine coolant temperature OR	> -50.00 [°C]		
					OBD Coolant Temp enabled	== True		
					Engine coolant temperature fault active	ECT_Sensor_FA == False		
					Outside air temperature	> -50.00 [°C]		
					Outside air temperature fault active	OAT_PtEstFiltFA == False		
					Actuator fault	>4.50		
					SENT position sensor fault			
					Valve perfomance test			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					failed this key on Delay timer after an Antisticking event occurred			

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	True True **************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms /sample	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 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	True True **************************** >=11.0 Volts False ****************************	4 failures out of 5 samples 1000ms / sample	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" 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: Criteria1: 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) >=12.50 V < **P2B86 Coolant Pump “A” Overspeed Fail Threshold Low Volatage** (RPM) <12.50 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	>= -30.00 °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) <= -20.00 degC >= 1.50 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: Criteria1: 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) >=12.50 V < **P2B87 Coolant Pump "A" Underspeed Fail Threshold Low Voltage** (RPM) <12.50 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	>= -30.00 °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) <= -20.00 degC >= 1.50 s		

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 >= 0 kPa) ==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	<--18.00 MPa <-18 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 >= 0 kPa) == 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	 >2.00mm^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.
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 (UF SCR, 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 - [∫ NOx_SCR2_Dwn_Msrd / ∫ 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 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; Tank partially frozen and able to inject the maximum injection quantity;	CalOut= 1.00 [Boolean]; # NOX_Snsr2_NOx_Flt # NOX_Snsr3_NOx_Flt # EGT_TempSCR2_UpFlt # EGP_PresSCR2_UpFlt ≠ EXF_TotExhSCR2_UpFlt # SCR_RDP_Flt # SCR_TipStuckFltSt # SCR_DEFMV_FA ≠ SCR_ChemicalMdlFlt_SCR2 ; NotDsbl = True [Boolean]; NotRun = True [Boolean]; FIR test trip < 1; FIR tot tests < 2; RR test trip < 2; RR tot tests < 4; DEF ready = True [Boolean]; DEF tank status = DEF_TankNotFrozen [Enumerative]; Debounce = 0 [s]; DEF tank status = DEF_TankPartiallyFrozen [Enumerative]; Debounce = 0[s]; No Emiss DEF strategy = True [Boolean]; Reliable = True [Boolean]; Reliable = True [Boolean]; Slip detection SCR2 reliable = True [Boolean]; DPF Rgn Compt > 1 [-]; Service Bay Test ==	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-[f NOx_SCR2 Dwn Ref/ f NOx_SCR1 JJp.Msrd] NOx_SCR2_Dwn_Ref is calculated as NOx_SCR2_Dwn_Ref = NOx_SCR2_Up_Msrd * offset In case of DualDEF architecture, NOx_SCR1_Up_Msrd is calculated as NOx_SCR2_Up_Msrd = NOx_SCR2_Up_Msrd +NH3_SCR2_Up_lnj The offset **(K_EffOffset_SCR2)** is calibrated in order to detect a malfunction. Test is performed when N0x+NH3 integral upstream SCR2 reaches 300.00 [mg]. Use this section if EWMA filter is enabled (1.00 == 1 [Boolean]).			Debounce time elapsed after DEF partially frozen; DEF strategy for emission reduction not inhibited in case of a DPF clogging, only for emergency vehicles; 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; 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; SCR1 average temperature in range; Debounce time elapsed after SCR1 average temperature is in range; Difference between SCR2 upstream and SCR2 downstream temperatures: - hiqher than first	ServNotRunning [Enumerative]; Debounce = 0 [s]; OAT > -20 [°C]; -21 [°C] < hysteresis range < -20 [°C] Pressure > 72 [kPa]; 70 [°C] < hysteresis range < 72 [°C] 220.00 [°C] < SCR1 mean temperature < 420 [°C]; Debounce = 5 [s]; SCR2 up/down diff temperature > **T_MinTempGrad_SCR2** [°C] SCR2 up/down diff temperature < **T_MaxTempGrad_SCR2** [°C]; Debounce = 10 [s]; **K_EffExhFlowCond_SCR2** > 1 H; Debounce = 2 [s];-10 < Delta temperature < 10 [°C/s]; Debounce = **t_DerTempDsblTmr_SCR2** [s]; DEF2 injected < 200 [mg/s]; Debounce = 3 [si;		

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

					calibration curve (f[SCR2 mean temperature])
					AND
					- lower than second calibration curve (f[SCR2 mean temperature]);
					Debounce time elapsed after condition based on difference between SCR2 upstream and downstream temperature is met;
					Exhaust mass flow 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
						SCR2 NOx up flow < 40 [mg/s];
						SCR2 NOx up flow > 0 [mg/s];
						SCR2 NOx up > 35 [ppm];
						SCR2 NOx up < 600 [ppm];
						Delta SCR2 NOx up flow < 50 [mg/s^2];
						Debounce = 1 [s];
						Debounce = 10.00 [s]
						f NOx_SCR2Up > **m_SlipNOxIntglThrsh_SCR2** [mg];
						Cmb # KaSCRR_b_MontrCombMode_SCR2 [Enumerative];
						Debounce = 10 [s];
						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 = 5 [s];
						Dos = PCS_Dosing | PCS_RemedialAction [Enumerative];
						Debounce = 10 [s];		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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; DEF2 injection quantity lower than calibration; Debounce time elapsed when DEF condition become true; Upstream SCR2 NOx flow measurement lower than calibration; Upstream SCR2 NOx flow measurement higher than calibration; Upstream SCR2 NOx sensor measurement higher than calibration; Upstream SCR2 NOx sensor measurement lower than calibration; Upstream SCR2 absolute NOx flow derivative lower than calibration; Debounce time elapsed when all NOx conditions become true; Slip conditions: - debounce time elapsed when no slip downstream SCR2 is detected any more, OR			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					- when slip is active, NOx flow upstream SCR2 accumulated shall be greater than a calibration curve (f[SCR2 average temperature]); Specific combustion modes not active; Debounce time elapsed after exiting from specific combustion modes; 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); Debounce time elapsed after conditions based on SCR2 NH3 storage level are met; SCR dosing in PCS Dosing or PCS Remedial Action; Debounce time elapsed afetr switching to PCS Dosing or PCS Remedial Action;			

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	This diagnostic is to detect if the fan system is undercooling. It does so by determining if the measured actual fan speed is sufficiently lower than the expected fan speed. The expected fan speed is modeled by translating fan commands to an RPM, then applying startup/ rampup/transport time delays, applying rate limiting to increasing and decreasing fan commands, and applying supply voltage compensation. If the actual fan speed is lower than the modeled fan speed by a calibratable threshold, the fault maturation for the corresponding DTC increments. The diagnostic employs a standard "X of Y" approach, where the diagnostic reports a failure to the diagnostic data manager if "X" faulted evaluations occur within each test consisting of "Y" samples. Only after first diagnostic activation per key cycle, the fan will be held commanded on for	This DTC compares the Measured Fan Speed and the Expected Fan Speed and ensures that it falls withing an acceptable margin of error (low side error comparison)	<= Speed Low Limit [Supporting Table] **P2CB9_LIN_Threshold**	a] Diagnostic Enabled b] Fan Commanded On c] Diagnostic System Disabled(via service tool) d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active (DTC U063300) g] LIN Bus Continuous Operation Fault Active (DTC P135D) h] Fan Our of Range High Fault Active (DTC P30F1) i] Fan Out Of Range Low Fault Active (DTC P30F0) j] Fan speed is above a min fan speed threshold (rpm)	a] = 1 [True if 1; False if 0] b] =TRUE c] =FALSE d] =TRUE e] =TRUE f] =FALSE g] =FALSE h] = FALSE i] = FALSE j] >= 580.00	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.
		enough time to ensure this monitor has an opportunity to mature a decision.						

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	This diagnostic is to detect if the fan system is undercooling. It does so by determining if the measured actual fan speed is sufficiently lower than the expected fan speed. The expected fan speed is modeled by translating fan commands to an RPM, then applying startup/ rampup/transport time delays, applying rate limiting to increasing and decreasing fan commands, and applying supply voltage compensation. If the actual fan speed is lower than the modeled fan speed by a calibratable threshold, the fault maturation for the corresponding DTC increments. The diagnostic employs a standard "X of Y" approach, where the diagnostic reports a failure to the diagnostic data manager if "X" faulted evaluations occur within each test consisting of "Y" samples. Only after first diagnostic activation per key cycle, the fan will be held commanded on for	This DTC compares the Measured Fan Speed and the Expected Fan Speed and ensures that it falls withing an acceptable margin of error (low side error comparison)	<= Speed Low Limit [Supporting Table] **P2CBB_LIN_Threshold**	a] Diagnostic Enabled b] Fan Commanded On c] Diagnostic System Disabled(via service tool) d] Battery Voltage In-Range e] LIN Bus based Fan Operation Enabled f] LIN Bus Lost Communication Fault Active (DTC U067C00) g] LIN Bus Continuous Operation Fault Active (DTC P135E) h] Fan Our of Range High Fault Active (DTC P30F3) i] Fan Out Of Range Low Fault Active (DTC P30F2) j] Fan speed is above a min fan speed threshold (rpm)	a] = 1 [True if 1; False if 0] b] =TRUE c] =FALSE d] =TRUE e] =TRUE f] =FALSE g] =FALSE h] = FALSE i] = FALSE j] >=875.00	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.
		enough time to ensure this monitor has an opportunity to mature a decision.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downstream filter relative pressure sensor offset rationality	P2CE5	This monitor verifies if the downstrem pressure for the particulate filter, checked in no flow conditions (0 kPa expected pressure when the engine is not running), is out of specification (sensor accuracy).	the absoulute difference between the Offset Differential value and the calibratabe offset Nominal vallue(22.79)	>[%2.20]	Monitor enabled by dedicated calibration AND **DRS Offset Learn Completed** AND Model Pipes Temperature enablement AND Offeset Report Done AND No DRS pressure electrical, rationality or quick change faults , no DRS temperature information electricalfaul, no DRS temperature quiche change faul, no enge not run timer fault.	1.00 [Boolean] ==TRUE ==TRUE ==FALSE DPS_CktFlt DPS_QckChgFlt DRS_StkFlt DRST_CktFlt DRST_QckChgFlt EngineModeNotRunTimer_FA	No debounce 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.
Downstream filter relative pressure sensor stuck in range	P2CE6	This monitor detects a stuck signal, reporting a failure if the signal does not change when it is expecteded to (during transient phases).	Downsteam pressure variation lower than expected	<= [%]0.14	Monitor enabled by dedicated calibration	1.00 [Boolean]	40.00 fail samples out of 50.00 samples	Type B, 2 Trips
					AND			
					Engine movement detection	== TRUE	Function task: 12.5 ms	
					AND			
					No electrical, plausibility, offset and quick change faults affecting the sensors, no DRS temperature electrical fault,no quick change DRS temperature fault	DRS.OfstTFTKO DPS_QckChgFlt DPS_CktFlt DRST_CktFlt DRST_QckChgFlt		
					Model Pipes Temperature enablement	==TRUE		
					AND			
					Engine speed variation	> 150.00 [rpm/s]		
					AND			
					Fuel quantity variation AND	> 6.00 [l/s]		
					Minimum air flow variation value	>200.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Downstream relative pressure sensor out of range low	P2CE7	This monitor refers to electrical fails on the pressure sensor, covering the out of range low. The monitor compares the raw downstream relativedifferential 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.	<0.02 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 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.
Downstream relative pressure sensor out of range high	P2CE8	This monitor refers to electrical fails on the downstream relativedifferential pressure sensor, covering the out of range high. The monitor compares the raw downstream relativedifferential pressure signal with a maximum threshold. If this threshold is overcome, an open circuit 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.	> 98.80 [%]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine Mode in Crank	1.00 [Boolean] ==TRUE ==TRUE =FALSE ==FALSE	158.00 fail samples out of 200.00 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.
Downstream relative pressure sensor quick change	P2CE9	This monitor checks if the raw signal variation is too high, comparing consecutive samples diffeerence with a threshold.	Difference between two subsequent downstream relative pressure raw signal samples exceeds a certain threshold	> 20.00 [%]	Monitor enabled by dedicated calibration AND Diagnostic system reset status AND Engine cranking phase AND Electrical errors flags (out of range high/low, loss of communication in case of digital sensor) AND Run Crank Active AND Run Cranck Ignition in Range AND No electrical fault on exhaust gas pressure sensor (out of range high/ low, loss of communication in case of digital sensor)	1.00 [Boolean] ==FALSE == FALSE == FALSE ==TRUE ==TRUE DRS.CktFlt	99.00 fail samples out of 200.00 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.
Reductant Injector 2 Performance - Low Reductant Consumption	P2EAD	This diagnostic checks the DEF hydraulic system for faults that can lead to diminished DEF delivery from 2nd DEF Injector.This monitor determines when RDP compensation has achieved a compensation factor so high that the expected pressure drop does not guarantee proper reductant delivery performance.	EWMA of Reductant Delivery Perfomance Compensation Factor on DEFMV2	> 1.45	Closed Loop of Reductant Delivery Performance Compensation on DEFMV2 active	== TRUE	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.
DC/DC Converter Actuator Voltage Sensor Circuit 1 Low Voltage	P3051	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 Actuator Voltage Sensor Circuit 2 Low Voltage	P3052	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 Actuator Voltage Sensor Circuit 1 High Voltage	P3053	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 Actuator Voltage Sensor Circuit 2 High Voltage	P3054	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.
DC/DC Converter Actuator Voltage 1 Performance	P3055	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 Actuator Voltage 2 Performance	P3056	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 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 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 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 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		4 seconds out of a 5 seconds window	Type B, 2 Trips
					All of the following criteria are met for	>= 2.00 s		
					12V System Voltage	> 11.00 V (with hysteresis disable < 10.00 V)		
					PECR_AuxCoolPmpSpdActl_Fol	= Not Active		
					PECR_AuxCoolPmpSpdActl_Av	= Not Active		

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_Fol PECR_AuxCoolPmpSpdActl_Av	 >= 2.00 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 > 10.00 C =TRUE <= 126.00 C =FALSE ****************************	4 failures out of 5 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 > 10.00 C =TRUE <= 126.00 C =FALSE ****************************	4 failures out of 5 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.
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 > 15,000 s > 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	This diagnostic is to determine if the fan speed feedback is incorrect. This is determined by measuring if the reported actual fan speed (in RPM) exceeds a lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed. If the measured fan speed exceeds the lower limit for an extended period of time so that a standard X of Y Figure of Merit matures, then the DTC is set.	Measured LIN Fan1 Speed must exceed a lower limit value to ensure measured feed speed is within an acceptable range	< = -110.00 rpm	a] Diagnostic Enabled b] Diagnostic System Disabled(via service tool) c] Battery Voltage In Range d] LIN Bus based Fan Operation Enabled e] LIN Serial data Lost communication Fault Active [DTC: U063200] f] LIN Serial data Continuous Operation Fault Active [DTC P135C]	a] = 1 [True if 1; False if 0] b] = FALSE c] = TRUE d] = TRUE e] = FALSE f] = FALSE	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	This diagnostic is to determine if the fan speed feedback is incorrect. This is determined by measuring if the reported actual fan speed (in RPM) is below an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed. If the measured fan speed exceeds the upper limit for an extended period of time so that a standard X of Y Figure of Merit matures, then the DTC is set.	Measured LIN Fan1 Speed must be below an upper limit value to ensure measured feed speed is within an acceptable range	> = 4,000.00 rpm	a] Diagnostic Enabled b] Diagnostic System Disabled(via service tool) c] Battery Voltage In Range d] LIN Bus based Fan Operation Enabled e] LIN Bus Lost Communication Fault Active [DTC U063200] f] LIN Bus serial data Continuous Operation Fault Active [DTC P135C]	a] = 1 [True if 1; False if 0] b] =FALSE c] =TRUE d] == TRUE e] =FALSE f] =FALSE	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	This diagnostic is to determine if the fan speed feedback is incorrect. This is determined by measuring if the reported actual fan speed (in RPM) exceeds a lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed. If the measured fan speed exceeds the lower limit for an extended period of time so that a standard X of Y Figure of Merit matures, then the DTC is set.	Measured LIN Fan 2 Speed must exceed a lower limit value to ensure measured feed speed is within an acceptable range	< = -110.00 rpm	a] Diagnostic Enabled b] Diagnostic System Disabled(via service tool) c] Battery Voltage In Range d] LIN Bus based Fan Operation Enabled e] LIN Serial data Lost communication Fault Active [DTC: U063300] f] LIN Serial data Continuous Operation Fault Active [DTC P135D]	a] = 1 [True if 1; False if 0] b] = FALSE c] = TRUE d] = TRUE e] = FALSE f] = FALSE	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	This diagnostic is to determine if the fan speed feedback is incorrect. This is determined by measuring if the reported actual fan speed (in RPM) is below an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed. If the measured fan speed exceeds the upper limit for an extended period of time so that a standard X of Y Figure of Merit matures, then the DTC is set.	Measured LIN Fan 2 Speed must be below an upper limit value to ensure measured feed speed is within an acceptable range	> = 4,000.00 rpm	a] Diagnostic Enabled b] Diagnostic System Disabled(via service tool) c] Battery Voltage In Range d] LIN Bus based Fan Operation Enabled e] LIN Bus Lost Communication Fault Active [DTC U063300] f] LIN Bus serial data Continuous Operation Fault Active [DTC P135D]	a] = 1 [True if 1; False if 0] b] =FALSE c] =TRUE d] == TRUE e] =FALSE f] =FALSE	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	This diagnostic is to determine if the fan speed feedback is incorrect. This is determined by measuring if the reported actual fan speed (in RPM) exceeds a lower limit for the fan speed, indicating that there is a failure of the measurement of the fan speed. If the measured fan speed exceeds the lower limit for an extended period of time so that a standard X of Y Figure of Merit matures, then the DTC is set.	Measured LIN Fan 3 Speed must exceed a lower limit value to ensure measured feed speed is within an acceptable range	< = -110.00 rpm	a] Diagnostic Enabled b] Diagnostic System Disabled(via service tool) c] Battery Voltage In Range d] LIN Bus based Fan Operation Enabled e] LIN Serial data Lost communication Fault Active [DTC: U067C00] f] LIN Serial data Continuous Operation Fault Active [DTC P135E]	a] == 1 [True if 1; False if 0] b] = FALSE c] = TRUE d] = TRUE e] = FALSE f] = FALSE	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	This diagnostic is to determine if the fan speed feedback is incorrect. This is determined by measuring if the reported actual fan speed (in RPM) is below an upper limit for the fan speed, indicating that there is a failure of the measurement of the fan speed. If the measured fan speed exceeds the upper limit for an extended period of time so that a standard X of Y Figure of Merit matures, then the DTC is set.	Measured LIN Fan 3 Speed must be below an upper limit value to ensure measured feed speed is within an acceptable range	> = 4,000.00 rpm	a] Diagnostic Enabled b] Diagnostic System Disabled(via service tool) c] Battery Voltage In Range d] LIN Bus based Fan Operation Enabled e] LIN Bus Lost Communication Fault Active [DTC U067C00] f] LIN Bus serial data Continuous Operation Fault Active [DTC P135E]	a] = 1 [True if 1; False if 0] b] =FALSE c] =TRUE d] == TRUE e] =FALSE f] =FALSE	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.
Propulsion System Performance	P31C2	This diagnostic indicates that the engine has stalled and the retry strategy has not been succesful in re-starting the engine.	While the engine is running, an engine stall event occurs. If the stall remediation actions are not successful in keeping the engine running and the engine retry strategy is not available or is not successful in restarting the engine. Note: When attempting to restart the engine, only 1 start retry is allowed per available actuator for each stall event. The number of total retries (all available actuators) is calibratible and limited each key cycle to 255.00 retry attempt(s).	Engine Stall Detected = TRUE	P31C3 Low Fuel Condition Low Fuel Condition Fault Engine Position Fault (Cam or Crank) Propulsion Allowed MEC Counter Condition valid for all applications except Strong Hybrid: Vehicle Speed is higher than for a time longer than Condition valid for Strong Hybrid applications only: Propulsion System is active for a time longer than	= NOT Fault Active =FALSE (% Total Fuel Level < 10.00% for > 30.00 sec) = FALSE = FALSE = TRUE = 0 = 10.00 = 0.50 = KePSAR_t_PropSysActvTmr	Fail condition met for 12.5 ms (1 sample)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			The engine is running.	Engine Start Stop State = ENGINE RUNNING	Engine Start Stop State Previous	!= ENGINE RUNNING	Pass condition met for 12.5 ms (1 sample)	

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 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	80.00 fails out of 100.00 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.
Lost Communication With Exhaust Gas Recirculation Temperature Sensor 1	U068E	This function has the purpose to detect is there any proble of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off, sensor internal faults that cause the SENT protocol communication faults. In this case two DTC shall be set, the DTCs relative to a Module 1 or Module2, it depende at which module the EGRT1 sensore is connected.	Message Faults OR Message Age	>0 100.00	Monitor Enable Condition RunCrankActive EngModeCrank RunCranklgnInRange DiagSystemDsbl	1.00 ==TRUE ==TRUE ==FALSE ==FALSE	19.00 failures out of 25.00 samples 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.
Downstream relative pressure sensor loss of communication	U0696	This monitor refers to electrical fails on the downstream relative pressure sensor, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults 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) Downstream relative pressure sensor message fault higher than a fixed value 2) Minimum digital downstream relative differential pressure sensor message age is reached	 > 0 >12.50 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 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 Bank 1 Sensor 1 DPS "A" Temperature Sensor	U06B4	This monitor refers to electrical fails on the differential pressure temperature sensor, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults 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 >12.50 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 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 Bank 1 Sensor 2 DRS "C" Temperature Sensor	U06B6	This monitor refers to electrical fails on the downstream relative pressure temperature information, due to loss communication issues. It is digital sensors specific.Sensor internal faults that cause SENT signal to be switched off.Sensor internal faults that cause SENT protocol communication faults 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) Downstream relative pressure sensor message fault higher than a fixed value 2) Minimum digital downstream relative differential pressure sensor message age is reached	 > 0 >12.50 [s]	Test enabled by calibration AND Run Crank Active AND Run Crank Igntion in Range AND Diagnostic system reset status AND Engine in Crank Mode	1.00 [Boolean] == TRUE ==TRUE ==FALSE ==FALSE	158.00 fail samples out of 200.00 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.
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 =	Run or Run/Crank active (high level)	4.5 seconds in 5.5 second window	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 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	Enabled Voltage in Range	XofY threshold: 8/10	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 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	Enabled Voltage in Range	XofY threshold: 8/10	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 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	Enabled Voltage in Range	XofY threshold: 8/10	Type B, 2 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 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	11V < RCVolt < 32V = Run/Crank OR = Accessory	1.0 second	Type B, 2 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	Enabled In Range	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.
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, 1 Trips

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	= Enabled		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	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	= Enabled	10 seconds to set DTC	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 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	= Enabled	10 seconds to set DTC	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 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 C, 1 Trip No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Input Power Circuit B - Ignition Input On/Start Circuit Correlation	U3024	Detect a Power B vs RuncCrank correlation error	Power B - RunCrank Voltage	> 3.00	PowerB - RunCrank Correlation monitoring enable = TRUE	1.00	40.00 failures out of 50.00	Type C, 1 Trip No MIL
					Battey Present	Battey Present = TRUE		
					RunCrank Active	RunCrank Active = TRUE		
					Starter Motor NOT Engaged	Starter Motor Engaged = FALSE		

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 >=-10.00 (°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 rVGTA Performance (Single and Two stage VGT DC Motor)	P0046	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening orclosing) 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)	>=40.00 [°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	>=-20.00 [°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.
Turbocharger VGT A Control Circuit Low (Single and Two stage VGT DC Motor)	P0047	This monitor checks if the DC-Motor VGT commands are shorted to ground	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.
Turbocharge rVGTA 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 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/ 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 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 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] <-40.00 [°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 Engine Outlet Coolant Temperature sensor and the Temperature and Manifold Air Pressure 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 the Temperature and Manifold Air Pressure sensor	MnfdTempSensorFA ==FALSE		
					No faults detected on Engine Outlet Coolant Temperature sensor	EECR_EngineOutlet_CktFA ==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_TemplnCktFA ==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 airflow. 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**	> 1.32 [ratio] <0.98 [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 (Engine Coolant	P0101: MAF performance enabling ==TRUE (see FreeForm) >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.			Temperature OR OBD Coolant Enable Criteria),	==TRUE		
					AND Engine Coolant Temperature	<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_Am bientAirP resDfltd ==FALSE AAP_AmbPresSnsrTFTK 0 ==FALSE		
					Throttle valve position	> 73.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					HP EGR valve position	<=1.00 [%]		
					No faults detected on HP EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<=1.60 [%]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults detected on LP EGR valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Engine works in IDLE, OVERRUN or HIGH LOAD conditions	Refer to "Engine conditions" Free Form		
			Drift high check: drift of the mass air flow	> 1.32 [ratio]	Intrusive Test in idle enabled by calibration	1.00==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples ==500.00 Sampling time is: 12.5 ms	
			Drift low check: drift of the mass air flow	<0.98 [ratio]	MAF rationality monitoring enabled by calibration	P0101: MAF performance enabling ==TRUE (see FreeForm)		
			The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass airflow. 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**		Diagnostic has not run in current driving cycle yet	==TRUE		
					SCR predicted NOx conversion efficiency	>0.60 [ratio]		
					Air control is working only in EGR control: Desired EGR rate	= 100%		
					Vehicle speed	<5.00 [kph]		
					No faults detected on vehicle speed sensor	VehicleSpeedSensor_FA ==FALSE		
					Desired fuel in range, with hysteresis	Enabled if < 10.00 [mm^3]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR Global OBD flag for fuel quantity at idle in range	AND > 4.00 [mm^3] Disabled if > 12.00 [mm^3] OR < 2.00 [mm^3] OR ==TRUE		
					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]		
					No fault present on induction air temperature	IAT_SensorFA ==FALSE IAT_SensorTFTKO		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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_AmbPresSnsrTFTK O ==FALSE		
					Throttle valve position	> 73.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		
					Engine speed in range OR Global OBD flag for idle speed in range	> 660.00 [rpm] < 850.00 [rpm] OR ==TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					for a time	>= 1.00 [s]		
					Intake manifold pressure in range	> 69.60 [kPa] < 110.00 [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	<=1.60 [%]		
					No faults detected on LP EGR valve position	LPE_PstnSnsrFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor			
					All conditions are verified for a time	> 2.00 [s]		
			Drift high check: drift of the mass air flow	> 1.32 [ratio]	Intrusive Test in overrun enabled by calibration	0.00 ==TRUE	Test is evaluated after the enabling conditions are satisfied for a number of samples ==500.00 Sampling time is: 12.5 ms	
			Drift low check: drift of the mass air flow	<0.98 [ratio]	MAF rationality monitoring enabled by calibration	P0101: MAF performance enabling ==TRUE (see FreeForm)		
			The drift of the mass air flow is calculated as the ratio between the MAF sensor reading and the estimated mass airflow. The ratio is averaged over a calibrate-able cumulative transient time.		Diagnostic has not run in current driving cycle yet	==TRUE		
					PT relay supply voltage in range	>11.00 [V]		
			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**		MAF sensor is not depowered	==TRUE		
					Estimated mass air flow is valid	MAF_AirFlowEstdSS_Not Vid ==FALSE		
					No Electrical or offset fault present on MAF sensor	MAF_MAF_SnsrCktOffstF A ==FALSE MAF_MAF_SnsrCktOffstT FKO ==FALSE		
					Outside Ambient Temperature in range	>-20.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR Fault present on Ouside Air temperature	OR OAT_PtEstFiltFA==TRUE		
					Induction air temperature	>-20.00 [°C]		
					No fault present on induction air temperature sensor	IAT_SensorFA ==FALSE IAT_SensorTFTKO ==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		
					Time elapsed after previous intrusive test request has aborted	> 1.00 [s]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine works in OVERRUN conditions, except for the conditions on Intake manifold pressure in range and in steady state (SS)	Refer to "Engine conditions" Free Form		
					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]		
					HP EGR valve position	<=1.00 [%]		
					No faults detected on HP			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGR valve position sensor	EGR_PstnSnsrFA ==FALSE		
					LP EGR valve position	<=1.60 [%]		
					No faults detected on LP EGR valve position sensor	LPE_PstnSnsrFA ==FALSE		
					Throttle valve position	> 73.00 [%]		
					No faults detected on Throttle valve position sensor	TPS_PstnSnsrFA ==FALSE		

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 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.
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	>5,950.00 [Hz]	Test enabled by calibration	1.00==TRUE	30.00 fail counts out of 38.00 sample counts	Type A, 1 Trips
					PT relay supply voltage in range	>11.00 [V]		
					Share High Side Driver closed	==TRUE	Function task:100 ms	
					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.
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 based on SQP	P01CB	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 1. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 1. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	80.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	previous driving cycle, otherwise the diagnosis starts from the interrupted status. Sample Rate: [1 Sample every cylinder firing event].	

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 based on SQP	P01CC	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 1. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 1. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <80.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	-the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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].	

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 based on SQP	P01CD	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 2. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 2. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	>100.00 [us] >5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] > -40.00 [°C] < 80.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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.
		able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

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 based on SQP	P01CE	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 2. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 2. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <80.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	Sample Rate: [1 Sample every cylinder firing event].	

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 based on SQP	P01CF	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 3. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 3. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated	> 100.00 [us] > 5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] > -40.00 [°C] < 80.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis have been already completed in the previous driving cycle, otherwise the diagnosis starts from the interrupted status.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		information and SQP is able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl	Sample Rate: [1 Sample every cylinder firing event].	

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 based on SQP	P01D0	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 3. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 3. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <80.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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.
		able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

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 based on SQP	P01D1	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 4. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 4. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] > -40.00 [°C] < 80.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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.
		information and SQP is able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

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 based on SQP	P01D2	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 4. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 4. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <80.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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.
		able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

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 based on SQP	P01D3	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 5. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 5. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] > -40.00 [°C] < 80.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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.
		information and SQP is able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	> -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

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 based on SQP	P01D4	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 5. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 5. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed Hysteresis and Delta on	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] > -40.00 [°C] <80.00	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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.
		able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Engine Speed related to the current gear index SQP Learning conditions enabled	[°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

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 based on SQP	P01D5	This diagnosis is able to detect an excessive positive drift on fuel injection quantity and/ or timing affecting injector 6. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 6. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] <120.00 [°C] > -40.00 [°C]	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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.
		information and SQP is able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive positive drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	< 80.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

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 based on SQP	P01D6	This diagnosis is able to detect an excessive negative drift on fuel injection quantity and/ or timing affecting injector 6. During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and checks the pressure drop on rail produced by the injection. By comparing the pressure drop value produced by the injection with the pressure drop that would be produced by an injection of a nominal fuel quantity (e.g. 1,5mm3), the SQP is able to calculate the drift, in term of energizing time, on injector 6. Moreover, SQP analyzes the rail pressure signal during the injection in order to find the timing position at which the injection starts (pressure falling edge position). Timing position is then converted into angular position using crank-wheel speed information and SQP is	Delta Energizing Time calculated OR Delta Start of Injection calculated .	>100.00 [us] >5.00 [deg]	SQP Quantity Diagnosis enabled OR SQP Timing Diagnosis enabled No Low Fuel level tank indication AND Boolean Flag used to enable low fuel level check is TRUE IF Injector Body Temperature is enabled, then Injector Body Temperature Hysteresis on Injector Body Temperature ELSE Engine Coolant Temperature Hysteresis on Engine Coolant Temperature Fuel Rail Temperature Fuel Filter Temperature Hysteresis on Fuel Temperature Engine Speed	1.00 1.00 1.00 LowFuelConditionDiagnostic 1.00 1.00 < 150.00 [°C] > 10.00 [°C] 3.00 [°C] ! 1.00 > 10.00 [°C] 3.00 [°C] < 120.00 [°C] >	Number of injection pulse for each StepET **KaFADD_Cnt_SQP_ECM_PulsStpET** [2.00] * **KaFADC_Cnt_SQP_PulsPerStrk** [2.00] until: -last two StepET quantities crosses the target quantity **KaFADR_V_SQA_Test** [2.00] OR -the number of StepET performed is higher than 5.00 Once per Trip if diagnosis 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.
		able to calculate the drift, in term of angular degree, 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 quantity area. Moreover, the mean is calculated between the angular positions of the several injections and it is compared to the selected start of injection in order to define the angular drift. If an excessive negative drift (in term of ET or in term of angle) is detected, then this diagnosis failed and the DTC is set; otherwise the diagnosis pass and the DTC is reset.			Hysteresis and Delta on Engine Speed related to the current gear index SQP Learning conditions enabled	-40.00 [°C] <80.00 [°C] > -40.00 [°C] 3.00 [°C] < 2,000.00 [rpm] + **KaFADC_n_SQP_HiThrshDelt** [rpm] > 1,125.00 [rpm] **KaFADC_n_SQP_HysThrsh** [rpm] FAD_SQP_LrnCondEnbl		

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;	== 1 [Boolean]	4 failures out of 8 samples	Type A, 1 Trips
					and Battery voltage	>11.00 [V]	100 ms/sample Continuous	
					and Key ON	-		
					and Engine is not cranking	-		
					and Engine Running	>= 1.00 [s]		
					and FUL_OutEnblCyl_CiEPSR_CylinderA	== 0 [Boolean]		
					and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderA	== TRUE);		

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;	== 1 [Boolean]	4 failures out of 8 samples	Type A, 1 Trips
					and Battery voltage	>11.00 [V]	100 ms/sample Continuous	
					and Key ON	-		
					and Engine is not cranking	-		
					and Engine Running	>= 1.00 [s]		
					and FUL_OutEnblCyl_CiEPSR_CylinderE	== 0 [Boolean]		
					and At least one injection pulse is requested by the application software (FUL_FuelInjectedCyl_CiEPSR_CylinderE	== TRUE);		

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 Quantity Monitoring	P0216	This DTC detects an ECU internal fault by comparing requested Energizing Time by Application SW and the actuated Energizing Time by HWIO (Direct Injection Fueling Outputs) on each actuated injection pulse for each cylinder. Two different thresholds (High and Low) are defined for detecting the fault. The monitoring will count an error also in case at least one pulse is dropped on a cylinder.	In order to identify whether there is a fault, 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. If the actuated ET is greater than the required by application SW, check the following condition: |ETpulseX,programmed (cyl)-ET pulseX,HWIO (cyl)| > calibratable threshold OR If the actuated ET is lower than the required by application SW, check the following condition: |ETpulseX,programmed (cyl)-ET pulseX,HWIO (cyl)| < calibratable threshold where: ETpulseX,HWIO (cyl)) = energizing time feedback read by HWIO for pulseX	> KeFULR_t_QntyMontrETHiThrsh < KeFULR_t_QntyMontrETLoThrsh	Test enabled by calibration Diagnostic System disabled Powertrain relay voltage in range Catalyst Warm-Up boolean from CSERS enabled (this boolean takes into account the combustion mode, the minimum soaking time and the ECT) No monitoring ShutOff conditions present (no FA on Boost Voltage, Injector Electrical monitorings, Pull In Period and Controller Status monitorings) At least one injection pulse is requested by the application software on all cylinders	== KeFULR_b_QntyMontrEnbl [Boolean] = FALSE >11.00 [V] == FALSE FUL_BoostVoltFA FUL_FuelInjCkt_FA FUL_PullInErrFA FUL_CntrlrStFA = TRUE	KeFULR_Cnt_QntyMontrFailLim failures out of KeFULR_Cnt_QntyMontrSmplLim samples Function Task: angular-based	Type A, 1 Trips

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

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; 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.
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 CeC1DG_e_WCAC_Water Templn, 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_Am bientAirP resDfltd ==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 SW for 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; -	8.00 failures out of 16.00 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 not enabled	FUL_FuelInjCkt_FA FUL_CntrlrStFA CrankSensor_FA AND CrankSensor_TFTKO		

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 = (IfGroup1 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 **KtFADD_K_FSA_EC M_PresAmbWghtLo)**	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 + 0.00 [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 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	> 17 [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] < 255 [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 _HiThrshGrp1** 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_EC M_PresAmbWghtHi)**	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 + 0.00 [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] < 255 [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 based on SQP	P02CC	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02CD	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_Max AdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02CE	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02CF	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02D0	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02D1	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02D2	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02D3	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02D4	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^{A}3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02D5	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02D6	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MinAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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 based on SQP	P02D7	This diagnosis (Authority monitoring) performs a check on the absolute Energizing Time learnt by SQP (Small Quantity adjustment based on rail Pressure drop). During Diesel Fuel Cut-off conditions SQP command the injection of a known quantity on one injector (e.g. 1,5mm^3) and estimates injected quantity by measuring pressure drop on rail. Each time a new value is entered in SQP map, the diagnosis checks if the DeltaET learned by SQP is greater 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 SQP. 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 SQP	Each time a new value is entered in SQP map the diagnosis checks if: DeltaET learnt by SQP 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 SQP. 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_SQP_MaxAdptDeltET** [us]	SQP Authority Diagnosis enabled SQP injection management enabled	1.00 FAD_SQA_InjMgntEnbld	Time required to perform a learning with SQP. 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.
		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)	>=40.00 [°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 Low	P02E2	This monitor checks if the Throttle commands are shorted to ground	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 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 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.
Cold Start Exhaust Gas Recirculation Current Performance	P034F	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	> 10.00 [%]	Cold Start strategy enabled	==TRUE	960.00 fail counts out of 1,200.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	== 1.00		
					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]		
					HP EGR position closed loop control active (no faults present on HP EGR position sensor, HP EGR flap, HP EGR position control deviation)	EGR_PstnSnsrFlt ==FALSE EGR_ActrFA ==FALSE EGR_VlvStkOpenTFTKO ==FALSE		
					HP EGR position setpoint in steady state conditions for minimum time	< 75.00 [%/s] > -75.00 [%/s] for >= 0.38 [s]		
					Engine coolant temperature higher or equal to minimum threshold (calculated with	>= -7.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					a table ECT/OAT) OR Engine cooling system target temperature reached (thermostat opening)			
					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.
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 (KnGLODJ_GP_Curr)** [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_RunCrankIgnlnRange = TRUE; VeGLOO_b_GlowPlugEnbl = TRUE; VeGLOO_b_ElectFlt = FALSE; GLO_GlowPlugSplyVoltCktTFTKO VeDRER_DiagSystemDsbl = FALSE;	60.00 fail samples over 120.00 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.
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_RunCrankIgnInRange = 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	>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 (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)	>=40.00 [°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 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	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 B Position Sensor Circuit Low Voltage (SENT position sensor)	P044C	This monitor checks if the LP EGR SENT 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_LossCommFIt ==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 EGR SENT position sensor is out of electrical range high	SENT position raw voltage > high threshold	>99.00 [%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 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	==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 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)	>=40.00 [°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 Low Voltage	P045C	This monitor checks if the LP EGR commands are shorted to ground	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 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 orclosing) 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)	>=40.00 [°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 Low Voltage	P0477	This monitor checks if the ETV commands are shorted to ground	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 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 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 Control Circuit Low Voltage	P0489	This monitor checks if the HP EGR commands are shorted to ground	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 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	==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	==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 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 >12.70 [%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 EGR 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	<6.80 [%5V] OR >12.70 [%5V] OR <84.40 [%5V] OR >96.20 [%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 >=-20.00 [°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		

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 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 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^{A}(#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 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 temperature sensor (EGT) 1 out of range monitoring Low	P0545	This monitor is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog Sensor:** 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. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a minimum threshold;	<0.00 [Ohm] <-72.80 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost Communication Error A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE ==FASSE ==TRUE	19.00 fail samples over 25.00 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 is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** 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. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a maximum threshold;	>100,000,000.00 [Ohm] >1,289.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost Communication Error A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 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
			
			case **StrongExhGasWarmIlp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmIlp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				<0.5* **P054EJFM_MinFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				<0.5* **P054EJFM_MinFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				<0.5* **P054EJFM_MinFuelIdleV2_G** [mm^3] depending on engine speed and engine coolant
					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
					
					CeFULReInGearNeutralPark:
					transmission
					)
					
					and
					engine speed
					
					and
					engine speed
						4.00 [s]
						
						1.00 [Boolean]
						
						unchanged
						
						in gear
						
						in park/neutral
						
						in gear and in park neutral
						
						> hysteresis(500.00 , 500.00 + 5.00)[rpm]
						
						<hysteresis(1,560.00, 1,560.00 + 5.00)[rpm]
							71.00 failures out of 142.00 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.
				temperature	and			
			<u>transmission in Park/ Neutral:</u>		(OBD Coolant Enable Criteria	== TRUE		
			Fuel quantity of the torque forming pulses	<0.5* **P054EJFM_MinFuelIdleV2_PN** [mm^{A}3] depending on engine speed and engine coolant temperature	OR engine coolant temperature)	> hysteresis(-21.00 , -20.00) [°C]		
			}		and outside air temperature	> hysteresis(-21.00 , -20.00) [°C]		
			case **HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):**		and vehicle speed	< 3.00 [kph]		
			{ <u>transmission in Gear:</u> Fuel quantity of the torque forming pulses	<0.5* **P054EJFM_MinFuelIdleHC_G** [mm^{A}3] depending on engine speed and engine coolant temperature	and enabled in the combustion mode	**P054EJFM_CombModesEnbl**		
					and Accelerator Pedal Position	<= 0.05 [%]		
			<u>transmission in Park/ Neutral:</u>		and Engine running	-		
			Fuel quantity of the torque forming pulses	<0.5* **P054EJFM_MinFuelIdleHC_PN** [mm^{A}3] depending on engine speed and engine coolant temperature	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* **P054EJFM_MinFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				<0.5* **P054EJFM_MinFuelIdleC1_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_GenericInjSysFA
						AND
						FUL_GenericInjSysFlt_		

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 **StrongExhGasWarmIlp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
			
			transmission in Park/ Neutral:
			Fuel quantity of the torque forming pulses
			
			}
			
			case **SoftExhGasWarmIlp:**
			{
			transmission in Gear:
			Fuel quantity of the torque forming pulses
				
				> 1.5* **P054FJFM_MaxFuelIdleV3_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054FJFM_MaxFuelIdleV3_PN** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054FJFM_MaxFuelIdleV2_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
					
					CeFULReInGearNeutralPark:
					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(500.00 , 500.00 + 5.00) [rpm]
						
						< hysteresis(1,560.00 , 1,560.00 + 5.00) [rpm]
							71.00 failures out of 142.00 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:		{ OBD Coolant Enable Criteria	== TRUE		
			Fuel quantity of the torque forming pulses	> 1.5* **P054FJFM_MaxFuelIdleV2_PN** [mm^3] depending on engine speed and engine coolant temperature	OR engine coolant temperature	> hysteresis(-21.00 , -20.00) [°C]		
					}			
			}		and outside air temperature	> hysteresis(-21.00 , -20.00) [°C]		
			case **HC unloading driving and park/neutral (HCS_DeHC_Drive || HCS_DeHC_Park):**		and vehicle speed	< 3.00 [kph]		
			{ transmission in Gear:		and enabled in the combustion mode	**P054FJFM_CombModesEnbl**		
			Fuel quantity of the torque forming pulses	> 1.5* **P054FJFM_MaxFuelIdleHC_G** [mm^3] depending on engine speed and engine coolant temperature	and Accelerator Pedal Position	<= 0.05 [%]		
					and Engine running	-		
			transmission in Park/ Neutral:		and PTO_PTO_Active	== 0 [Boolean]		
			Fuel quantity of the torque forming pulses	> 1.5* **P054FJFM_MaxFuelIdleHC_PN** [mm^3] depending on engine speed and engine coolant temperature	and Run Crank voltage	>= 11.00 [V]		
			}		and if the transmission is manual (if the Gear is Neutral AND the clutch pedal position	>75.00		
			default:					

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* **P054FJFM_MaxFuelIdleC1_G** [mm^3] depending on engine speed and engine coolant temperature
				
				> 1.5* **P054FJFM_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 SW for 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; -	8.00 failures out of 16.00 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_CntrlrStFA CrankSensor_FA AND CrankSensor_TFTKO		

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 -ASICDC-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 > 4,000.00 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] -	**P062B_CSM_ASIC_RAMCorruption_FailLim** failures out of **P062B_CSM_ASIC_RAMCorruption_SmplLim** 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 Aground 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. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCranklgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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_RunCrankIgnInRange = 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 Aground 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. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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_RunCrankIgnInRange = 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 Aground 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. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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_RunCrankIgnInRange = 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnInRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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 within a calibratable range; Diagnostic system is not disabled;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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 Aground 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. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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_RunCrankIgnlnRange = 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 Aground 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. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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_RunCrankIgnlnRange = 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 Aground 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. Aground short condition shall not be detected if the circuit impedance is higher than Rload_min. Aground 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 within a calibratable range; Diagnostic system is not disable;	1.00 [boolean] VePMDR_b_RunCrankActive = TRUE; VeEMDR_b_EngModeCrank = FALSE; VeLVTR_b_RunCrankIgnlnRange = TRUE; GLO_GlowPlugSplyVoltCktTFTKO >2.50 <97.50 [%] 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_RunCrankIgnlnRange = 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	0.23 < NaGLOD_R_GlowPlug <2.00	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_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.
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	0.23 < NaGLOD_R_GlowPlug <2.00	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 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	0.23 < NaGLOD_R_GlowPlug <2.00	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_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.
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	0.23 < NaGLOD_R_GlowPlug <2.00	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_RunCrankIgnInRange = 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 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	0.23 < NaGLOD_R_GlowPlug <2.00	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_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.
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	0.23 < NaGLOD_R_GlowPlug <2.00	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_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.
Rail Pressure deviation during cut off based on SQP	P1089	This diagnosis monitors the presence of rail pressure deviation during deceleration fuel cut-off, preventing the enablement of SQP learning. Rail pressure is the only SQP enabler that is not monitored with an accuracy enough to detect a failure that would prevent a correct SQP behavior. So high pressure fuel rail system shall be monitored to detect a rail pressure behavior that does not allow an SQP correct learning. As soon as SQP strategy requests a rail pressure set point a debounce shall start. After that the debounce time is expired or SQP starts to inject, the diagnosis in enabled and a timer shall start to count the SQP learning time on each SQP rail pressure levels. If on at least one rail pressure level: the timer is expired before that SQP strategy performs a learning on all cylinders, then the diagnosis shall report a Test Fail and the DTC	The timer is expired before that SQP strategy performs a learning on all cylinders	> **KaFADD_t_SQP_Max RailPresTrsh** [ms]	Test enabled by calibration All enabling conditions for SQP learning different from Rail Pressure steady state are satisfied Calibrateable delay time since SQP started to request rail pressure set-point has expired	1.00 FAD_SQA_LrnPresEnbl 1.20 [ms]	Time required to perform a learning with SQP on one rail pressure level. 1 Sample each SQP rail pressure level learning complete.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		is set. If on all rail pressure levels: the timer is not expired and SQP strategy performs a learning on all cylinders, then the diagnosis shall report a Test Pass and the DTC is unset.						

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 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 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 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 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 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] <-40.00 [°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	LEV_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.
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 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 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 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 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) 1 key-on monitoring	P113B	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	>20.00 [°C] >23.53	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S1_LostCommFA EGT_CED_B1S1_HiFA EGT_CED_B1S1_LoFA EGT_QED_B1S1_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -16.47 3.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 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.
					EGT_TempAvgVld	==FALSE		
					EnginnotruntimerFA	==TRUE		
					A calibratable delay time for the sensor initialization shall be elapsed			

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 key-on monitoring	P113C	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	>20.00 [°C] >25.46	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S2_LostCommFA EGT_CED_B1S2_HiFA EGT_CED_B1S2_LoFA EGT_QED_B1S2_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -14.50 3.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 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.
					EGT_TempAvgVld	==FALSE		
					EnginnotruntimerFA			

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 key-on monitoring	P113D	This function has the purpose of warn the system/driver that the EGT sensor is malfunctioning (the EGT sensor read at key on is not comparable with the other system temperature at the beginning of the driving cycle).	The absolute difference between the EGT average and EGT temperature at key on in case block heater detectect a different threshold shall be use	>20.00 [°C] >30.50	Monitor enabled by dedicated calibration AND DiagSystemDsbl AND RunCrankIgnInRang AND Key-on Report done AND Ambient temperature greater than a calibration with hysteresis no out of range hi/low, lost comm and quick change error No engine not run timer error EGT_CED_B1S3_LostCommFA EGT_CED_B1S3_HiFA EGT_CED_B1S3_LoFA EGT_QED_B1S3_FA	1.00 [Boolean] ==FALSE ==TRUE ==FALSE > -9.50 3.00 ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE ==FALSE ==TRUE	2.00 fail samples out of 2.00 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.
					EGT_TempAvgVld EnginnotruntimerFA A calibratable delay time for the sensor initialization shall be elapsed	==FALSE ==TRUE		

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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 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 Soot Sensor supply undervoltage detected, i.e. supply sensor voltage for a time No electrical fault detected on Soot Sensor If enabled, the Soot Sensor temperature circuit low and high monitoring reported a test pass Ambient Air pressure Ambient air pressure sensor not faulty Temperature stored at last sensor power up is still reliable Timer since Soot Sensor heating off is not affected	 > 11.00 NOT(SBR_RlyFA) NOT(U02A3) > 9.00V > 0.10s NOT(SOT_ElecIFlt) TPTKO on P1477 TPTKO on P1478 >70.00 KPa AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd NOT(ModuleOffTimeErr)	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.
					by error on module off timer			
					Calculation of the reference temperature at system start up is valid:	EGT_TempAvgVld		
					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 function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 1st sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 0.00 Diagnostic threshold: 0.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > -2,000.00 and < 2,000.00 Engine run time > 0.00 Exhaust gas > -2,000.00 and < 2,000.00 Exhaust gas flow rate variation < -2,000.00 and then < 2,000.00 hysteresis) for a time > 0.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S1_FA, EGT_KOD_B1S1_FA, EGT_CED_B1S1_HiFA, EGT_CED_B1S1_LoFA, EGT_CED_B1S1_LostCo mmFA and EGT_SRD_B1S1_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 65,535.00 fail sample over 0.00 samples. Debounce time increment every time an average value is available (0.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diesel specific Reliable exhaust manifold pressure information Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds A calibratable delay time for the sensor initialization shall be elapsed	**Diesel specific** Exhaust manifold pressure reliability = TRUE Time after each combustion mode > **EGT_ERD_B1S1_CombModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S1_CombModeEnbl** **Gasoline specific** Time after GPF regeneration > 0.00 Time after scavenging > 0.00 Time after catalyst light-off > 0.00 ==TRUE		

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 function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 2nd sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 0.00 Diagnostic threshold: 0.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > -2,000.00 and < 2,000.00 Engine run time > 0.00 Exhaust gas > -2,000.00 and < 2,000.00 Exhaust gas flow rate variation < -2,000.00 and then < 2,000.00 hysteresis) for a time > 0.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S2_FA, EGT_KOD_B1S2_FA, EGT_CED_B1S2_HiFA, EGT_CED_B1S2_LoFA, EGT_CED_B1S2_LostCommFA and EGT_SRD_B1S2_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 65,535.00 fail sample over 0.00 samples. Debounce time increment every time an average value is available (0.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diesel specific Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds A calibratable delay time for the sensor initialization shall be elapsed	**Diesel specific** Time after each combustion mode > **EGT_ERD_B1S2_CombModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S2_CombModeEnbl** **Gasoline specific** Time after GPF regeneration > 0.00 Time after scavenging > 0.00 Time after catalyst light-off > 0.00 ==TRUE		

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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 function has the purpose of warning the system/driver that the exhaust gas temperature sensor reading for the 3rd sensor on the 1st bank is not reliable, while engine running conditions have been met. The strategy compares the sensor reading with a reference modeled value; a fault condition is detected if the average deviation over a defined monitoring window exceeds a certain threshold on a certain number of samples. The monitor is expected to run continuously, once the enabling conditions are verified. In order to detect the fault in a robust way, it is needed to run the check when stationary conditions are met, the modeled temperature is reliable and there no particular combustion/ operating conditions that would prevent from correctly predict and model the sensor reading.	In order to give a fail, the mean difference bewteen sensed information and modeled signal, evaluated on a defined window, shall exceed a dedicated threshold.	Window length: 0.00 Diagnostic threshold: 0.00	No faults affecting the exhaust gas temperature model estimation Modeled temperature information in range Engine run time greater than a threshold Exhaust gas flow rate upstream the temperature sensor in range Exhaust gas flow rate variation less than a therhsold and then not exceeding an high hysteresis margin for a minimum time Run crank ignition in range Diagnostic system not disabled No fault active conditions detected on the sensor No error conditions affecting the sensor	Exhaust gas temperature sensor model fault = FALSE Modeled temperature > -2,000.00 and < 2,000.00 Engine run time > 0.00 Exhaust gas > -2,000.00 and < 2,000.00 Exhaust gas flow rate variation < -2,000.00 and then < 2,000.00 hysteresis) for a time > 0.00 Run crank ignition in range = TRUE Diagnostic system disabling = FALSE EGT_QED_B1S3_FA, EGT_KOD_B1S3_FA, EGT_CED_B1S3_HiFA, EGT_CED_B1S3_LoFA, EGT_CED_B1S3_LostCommFA and EGT_SRD_B1S3_FA = FALSE Quick change, key on rationality, electrical checks, stuck in range errors = FALSE	Fault validation on 65,535.00 fail sample over 0.00 samples. Debounce time increment every time an average value is available (0.00)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Diesel specific Time after transition from each combustion mode greater than a dedicated threshold AND The combustion mode shall be suitable for running the monitor **Gasoline specific** Time after transition from GPF regeneration, scavenging and catalyst light-off greater than dedicated thresholds AND A calibratable delay time for the sensor initialization shall be elapsed	**Diesel specific** Time after each combustion mode > **EGT_ERD_B1S3_Comb ModeDly** AND Current combustion mode enabling condition = **EGT_ERD_B1S3_Comb ModeEnbl** **Gasoline specific** Time after GPF regeneration > 0.00 Time after scavenging > 0.00 Time after catalyst light-off > 0.00 ==TRUE		

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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	 >11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 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: 160 fails out of 160 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_A	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_A	FALSE		

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		Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

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 Powertrain relay voltage NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_B Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_B	 >11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 N0x1 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 EGR measured position Exhaust mass flow is within a range DEF injection is within a range Engine speed is within a range Engine Out NOx Sensor	**NOX_S1_OfstMntrEnblCmbMode** TRUE TRUE >11.00V TRUE TRUE < 0.06% >-0.06% > 10.00 sec > 9.90 V TRUE < 100.00% < 80.00 g/s > 10.00 g/s < 500.00 mg/s > -1.00 mg/s < 4,500.00 rpm > 800.00 rpm < 410.00 °C > -20.00 °C	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 0.00 s. 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.
					temperature is within a range			
					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 > 3.00s		
					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_OutOfRngLoFit ==FALSE		
					No out of range high failure on NOx1 Sensor	NOX_NOx1_OutOfRngHiFit ==FALSE		
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		
					No invalid data failure on NOx1 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE		
						EGR_PstnShtOffReqFA ==FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No failure on EGR valve actuator No failure on high pressure fuel rail system No failure on injectors No fault on any exhaust mass flow model input No failure on air control system No failure on NOx Sensor Bus relay circuit No failure on Upstream SCR temperature Sensor DFCO by-pass not enabled	FHPJnjLeakage ==FALSE FUL_GenericInjSysFlt ==FALSE EXM_TurbFlowNotValid ==FALSE AIC_AirShtOffReq ==FALSE SBR_RlyFA==FALSE NOX_Snsr1_TempFlt ==FALSE TRUE		

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 N0x2 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 failure on DEF system 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	EGT_TempSCR_UpFlt ==FALSE VehicleSpeedSensor_FA ==FALSE EXF_TotExhSCR_UpFlt ==FALSE HCI_GenericShtOffReq ==FALSE SBR_RlyFA ==FALSE SCR_HC_SCR_DwnFlt ==FALSE SCR_DEFSysFlt_IUPR_DenDsbl ==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	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 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.
					on NOx2 Sensor	==FALSE		
					No invalid data failure on NOx2 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE		
					Powertrain relay voltage	> 11.00V		
					Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	< 0.06% >- 0.06%		
					b) condition a) is fulfilled for time	> 45 s		
					Sensor supply in range	> 9.90V		
					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	> 0rpm < 3,000 rpm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					h) condition g) is fulfilled for time	> 1 s		
					i) After injection pulse is not used for time	> Os		
					j) upstream SCR temperature is in range	> 150 °C < 400 °C		
					k) exhaust mass flow is in range	> Og/s < 250 g/s		
					l) conditions j) k) are fulfilled for time	> 30 s		
					m1) DEF1 injection is in range	>= Omg/s < 350mg/s		
					m2) DEF2 injection (if present) is in range	>= Omg/s < 350mg/s		
					m) conditions m1) m2) are fulfilled for time	> 0 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	< 2.50m/s^2		
					r) condition q) could be ignored if idle vehicle condition s.x) is fulfilled			
					s.1) vehicle speed in idle	< 5koh		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range	< 10kph		
					s.2) condition s.1) fulfilled for time	> 15s		
					t) idle before keyoff for a time	< 150 s		
					u) Upstream SCR temperatures derivative in range	< 5°C/s		
					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			
					y1) debounce time after last DEF RDP event on first injector elapsed before keyoff	>120s		
					y2.1) debounce time after last DEF RDP event on second injector (if present) elapsed before keyoff. Debounce time needed is the output of a calibratable curve (f [temperature SCR2 upstream during RDP2 eventl)	>= **NOx2_Ofst_t_DsblTmTempUpSCR2_RDP2** s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					z) DEF system ready to inject z1) Number of DPF regeneration events successfully completed after vehicle extis from assembly plant (SCR catayst de-greened); z2) condition z1) is used only if KeNOXD_b_S2_Ofst_SCR_GreenCond is True A) In case of DEF Tank partially frozen or system in transient dosing, the following conditions is used, as well: A1) alpha ratio B) in case system comes out from condition A) during the driving cycle, then, time passed at key-off C) DEF strategy for emission reduction inhibition is not requested in case of DPF clogging 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	TRUE >= 1 KeNOXD_b_S2_Ofst_SCR_GreenCond = 1 >10.00 >120s TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					are fulfilled: D) stabilization timer to trigger execution E) 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 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 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] < 9.60 [%5V] OR > 14.60 [%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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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	==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 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 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 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 Overtemperature	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 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.
Particulate Matter Sensor Supply Voltage Circuit High	P1473	This diagnosis detects a short to power on the soot sensor voltage supply line	Soot Sensor Control Unit supply voltage	> 17.30 V OR < 8.40 V	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: 11.00 consecutive failures OR 11.00 failures out of 40.00 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: Soot Sensor Electrode Voltage ON 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(P1473)	Time counter: 24.00 consecutive failures OR 24.00 failures out of 96.00 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 supply voltage	 >2 V	Soot Sensor Control Unit conditions: Soot Sensor Electrode Voltage OFF 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 IDE monitors that run during sensor regeneration have completed a report and 41 seconds had passed from that event (Diagnostic is enabled also prior the execution of the sensor regeneration)	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473)	Time counter: 23.00 consecutive failures OR 23.00 failures out of 92.00 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 Shunt Circuit High Current	P147B	This diagnosis detects a no more efficient soot sensor	Soot Sensor Electrode raw current	>6.70	Soot Sensor bus relay is commanded on			Type B, 2 Trips
					No electrical fault active on Soot Sensor bus relay	NOT(SBR_RlyFA)		
					No faults of CAN communication loss with Soot Sensor	NOT (SOT_SootSnsr_SrlLcFA)		
					No electrical fault detected on Soot Sensor	NOT(SOT_EleclFlt)		
					Soot Sensor is in measurement phase or Shunt circuit diagnostic mode has been triggered			
					Soot Sensor Electrode current measurement enabled			
					Transmission fault with sensor control unit not present	NOT (SOT_SootSnsr_SrlFsFA)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Particulate Matter Sesnor Sensing Element Internal Supply Circuit High Voltage	P1497	This diagnosis detects internal errors to the IDE Supply voltage (SOU internal error)	IDE Supply voltage signal	<=4.7 V	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 (SOT_SootSnsr_SrlLcFA) NOT(P1473)	Time counter: 9.00 consecutive failures OR 9.00 failures out of 32.00 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 Control Module Internal Supply Voltage Circuit	P1498	This diagnosis detects internal errors to the sensor Supply voltage (SCU internal error)	Sensor supply voltage (SRC Low voltage treshold) OR Sensor supply voltage (SRC High voltage treshold)	< 1.1 V >4.9 V	Soot sensor bus relay is commanded on for a time No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Engine is not in cranking phase	>(0.00) NOT(SBR_RlyFA) NOT (SOT_SootSnsr_SrlLcFA)	Time counter: 4.00 consecutive failures OR 30.00 failures out of 12.00 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.
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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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	P14AD	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 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	 >11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	 >11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 N0x3 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 failure on DEF system 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	EGT_TempSCR2_UpFlt ==FALSE VehicleSpeedSensor_FA ==FALSE EXF_TotExhSCR_UpFlt ==FALSE HCI_GenericShtOffReq ==FALSE SBR_RlyFA==FALSE SCR_HC_SCR_DwnFlt ==FALSE SCR_DEFSysFlt_IUPR_DenDsbl == FALSE OXY_NOx3ChkLoadFlt ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_C ==FALSE N0X_Snsr3_FltSt ==FALSE NOX_NOx3_OutOfRngLoFit ==FALSE NOX_NOx3_OutOfRngHiFit ==FALSE	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.
					No current control failure on NOx3 Sensor	NOX_NOx3_StBitChkFlt ==FALSE		
					No invalid data failure on NOx3 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_C == FALSE		
					Powertrain relay voltage	> 11.00V		
					Sensor heater is in range: a) (Sensor heater raw resistance - Sensor heater target resistance) / Sensor heater target resistence	< 0.06% >-0.06 %		
					b) condition a) is fulfilled for time	> 45 s		
					Sensor supply in range	> 9.90V		
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	> Os		
					j) upstream SCR2 temperature is in range	> 150 °C < 400 °C		
					k) exhaust mass flow is in range	> Og/s < 250 g/s		
					1) conditions j) k) are fulfilled for time	>30 s		
					m1) DEF injection is in range	>= Omg/s < 350mg/s		
					m2) DEF2 injection (if present) is in range	>= Omg/s < 350mg/s		
					m) conditions m1) m2) are fulfilled for time	> 0 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	< 2.50m/s^2		
					r) condition q) could be ignored if idle vehicle condition s.x) is fulfilled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					s.1) vehicle speed in idle range	< 5kph < 10kph		
					s.2) condition s.1) fulfilled for time	> 15s		
					t) idle before keyoff for a time	< 150 s		
					u) Upstream SCR2 temperatures derivative in range	< 5°C/s		
					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 timers of conditions v), x) are reset when condition w) is verified	> 90s		
					y) time between keyoff and last DEF RDP event on first or second (if present) injector	> 120s		
					z) DEF system ready to inject	TRUE		
					z1) Number of DPF regeneration events successfully completed after vehicle exits from assembly plant (SCR2 catalyst de-greened);	>= 1		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					z2) condition z1) is used only if KeNOXD_b_S3_Ofst_SCR2_GreenCond is True A) In case of DEF Tank partially frozen or system in transient dosing, the following conditions is used, as well: A1) alpha ratio B) in case system comes out from condition A) during the driving cycle, then, time passed at key-off C) DEF strategy for emission reduction inhibition is not requested in case of DPF clogging 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: D) stabilization timer to trigger execution E) N0x3 Self Diag execution has been completed	KeNOXD_b_S3_Ofst_SCR2_GreenCond = 1 > 10.00 >120s TRUE >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_RunCrankIgnInRange = 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 Supply Circuit (Single and Two stage VGT DC Motor)	P169E	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.
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.
Turbocharge rVGTA 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 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 Particulate Filter Efficiency Below Threshold Bank 1 - (EWMA filter used)	P2002	This diagnosis detects a cracked Diesel Particulate Filter	{The soot sensor current filtered by using EWMA filter is} OR {The soot sensor current filtered by using EWMA filter is AND - DPF Efficiency Below Threshold Bank 1 previously detected (TRUE -> fault active) }	>11.04 > 11.04 DPF_1DK_ModelNotVld ===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_TurbFlowNotRlb ==FALSE SOT_ExhTempSootSnsrVld ==TRUE SOT_TotExhSootSnsrVld ==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 - 0.85 if RR is active - 0.55 if neither FIR nor RR are active. Initial filter value: - 0.28 when FIR is activated - 0.41	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	< 30.00 [Cnt]	when RR is activated	
					During sensor measurement phase, Duration of Autostop phase	< 1,000.00 [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) NOT (INM_EGR_RateNotVld)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					EGR rate signal not valid			

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 [%]	P20F8 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 (Smart Swirl with Position Feedback)	P2008	This monitor checks if the Swirl command is 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	==1.00 >11.00 [V]	240.00 fail counts out of 300.00 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.
Intake Manifold Runner Control Control Circuit Low Voltage (Swirl DC Motor)	P2009	This monitor checks if the DC-Motor Swirl commands are shorted to ground	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 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 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	<11.70 [%5V] OR >17.60 [%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.
Intake Manifold Runner Control Circuit High Voltage (Swirl DC Motor)	P2010	This monitor checks if the DC-Motor Swirl 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 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.
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 is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog sensor:** 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. **Digital termocouple sensor:** The monitor compares the EGT 2 raw value (temperature value) with a minimum threshold;	<0.00 [Ohm] <-72.80 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples ove 25.00 rsamples 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 is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** 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. **Digital termocouple sensor:** The monitor compares the EGT 1 raw value (temperature value) with a maximum threshold;	>100,000,000.00 [Ohm] >1,289.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status Lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 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 Circuit Range/ Performance Bank 1 Sensor 1	P2080	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor1_Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	>10,800.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S1_FA		
					No quick change fault	EGT_QED_B1S1_FA		
					no out of range high fault	EGT_CED_B1S1_HiFA		
					no out of range low fault	EGT_CED_B1S1_LoFA		
					no lost of comm fault	EGT_CED_B1S1_LostCommFA		
					no fault affected engine not run timer	==TRUE		
					AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

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 Absolute EGT temperature sensor raw difference value	> 100.00 [°C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault s affecting the sensor AND Unfitered temperatature value AND	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas1_Flt >=140.00 <=1,070.00 ==TRUE	12.00 fail samples out of 25.00 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.
					A calibratable delay time for the sensor initialization shall be elapsed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Gas Temperature Sensor Circuit Range/ Performance Bank 1 Sensor 2	P2084	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor2 _Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	>10,800.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S2_FA		
					No quick change fault	EGT_QED_B1S2_FA		
					no out of range high fault	EGT_CED_B1S2_HiFA		
					no out of range low fault	EGT_CED_B1S2_LoFA		
					no lost of comm fault	EGT_CED_B1S2_LostCommFA		
					no fault affected engine not run timer	==TRUE		
					AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

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 Absolute EGT temperature sensor raw difference value	>100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas2_Flt >= 140.00	12.00 fail samples out of 25.00 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.
					AND A calibratable delay time for the sensor initialization shall be elapsed	<= 1,070.00 ==TRUE		

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 orclosing) 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 >=0.38 [s] >= 40.00 [°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 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 set point 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_A 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 NOx1 Sensor Combustion mode dependent enabling flag Fuel request: a) fuel request derivative is within a range b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE TRUE <0.06% >- 0.06% > 10.00 sec TRUE NOX_Snsr1_FltSt ==FALSE **NOX_S1_StBitChkEnblCmbMode** <= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec FALSE	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 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: NOx raw read	 < -90 ppm	Fuel injection quantity request Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx1 CAN communication Sensor supply in range Sensor dewpoint is reached No current control failure on NOx1 sensor No electrical failure on NOx1 sensor Combustion mode dependent enabling flag No invalid data failure on NOx1 CAN frames	> -1 mm^3 >11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_A == FALSE > 9.90 V TRUE NOX_NOx1_StBitChkFlt ==FALSE NOX_Snsr1_ElecFA ==FALSE **NOX_S1_OutRngMinCmbMode** CAN_InvalidDataFlt_BusB_NOxSnsr_A == 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 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	>11.00V	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 == FALSE	Task=25ms	
					Sensor supply in range	> 9.90 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 invalid data failure on NOx1 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE		
					Air system control is active	TRUE		

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 NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 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 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	>11.00V	Time counter: 80 fails out of 80 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	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_A	FALSE		

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 NOx Sensor Bus relay is commanded ON CAN_LostComm_FltN_BusB_NOxSnsr_A Sensor supply in range Sensor dewpoint is reached CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 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	 >0.06 <- 0.06	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 a) Combustion mode dependent enabling flag b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V FALSE TRUE > 45 sec > 180 sec > 5 sec **NOX_S1_HtrPerfEnblCmbMode** > 0 sec FALSE	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 <9.90 V	Engine is running Powertrain relay voltage NOx Sensor Bus relay is commanded ON a) NOx Sensor Dewpoint is reached b) condition a) shall be fulfilled for time CAN_LostComm_FltN_BusB_NOxSnsr_A CAN_InvalidDataFlt_BusB_NOxSnsr_A	TRUE >11.00V TRUE TRUE >0sec FALSE FALSE	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 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 < 9.90 V	Engine is running	TRUE	Time counter: 125 fails out of 250 samples Task=25ms	Type B, 2 Trips
					Powertrain relay voltage	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx Sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	>0sec		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_A	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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)	< 0.01 [kPa/(l/s)]	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 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_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		
						>45.00 [l/s] for> 1.00 [s]		

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	>-1.00 [Pct] AND <400.00 [Pct]		
						>200.00 [DegC] AND < 700.00 [DegC] for >45.00 [s]		
					Soot trapped in the DPF estimated by statistical model	> -256.00 [DegC]		
						==TRUE		
						> -20.00 [DegC]		
						<100.00 [%]		
					Exhaust gas temperature at DPF inlet is between two thresholds for a minimum calibrateable time	> **Lo_FR_MontrEnblLoThrsh** [mm^3] AND < **Lo_FR_MontrEnblHiThrsh** [mm^3] for >0.00 [s]		
						==TRUE		
					Engine Coolant Temperature			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR OBD Coolant Enable Criteria	-2.00 [Pct] < Soot < 500.00 [Pct]		
					Ambient Temperature			
					Correction of CCB model			
					The fuel request is between two thresholds for a minimum calibrateable time			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Icing risk for delta pressure sensor’s pipes is low Soot Trapped in the DPF estimated by 1dK model is in between the two Calibration limits			

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 Diagnosis runs in overrun when SQP learning is enabled if KeOXYD_b_NOx1_PlausOvrrnEnbl_SQP OR Diagnosis runs if KeOXYD_b_NOx1_PlausOvrrnEnbl_SQP AND No SQP 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 ==TRUE (0.00) ==FALSE (0.00) 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	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.
						FHPJnj LeakageFA		
						EGR_PstnShtOffReqFA		
						(MAF_MAF_SnsrFA AND MAF_MAF_SnsrTFTKO)		
						(MAP_SensorFA AND MAP_SensorTFTKO)		
					Stable fuel cut-off condition has been reached i.e. following conditions are met for a calibrateable time:	> 2.00 [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	> 180.00 [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 N0x2 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 set point b) Delta Ip2 <426nA/10msec c) Delta Ip1 < 2.34 uA aorund its set point	Powertrain relay voltage	> 11.00V	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_B	FALSE		
					Sensor supply in range	> 9.90V		
					Engine is not cranking	TRUE		
					Sensor dewpoint is reached	TRUE		
				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	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	<0.06 > - 0.06 > 10.00 sec		
					Engine is running	TRUE		
					No 02 plausibility in load fault on NOx2	OXY_NOx2ChkLoadFlt == FALSE		
			NOx stability flag: (OFF_Time/TOTAL_time)	>0.50%	No electrical failure on NOx2 Sensor	NOX_Snsr2_FltSt ==FALSE		
			Lambda stability flag: (OFF_Time/TOTAL_time) Note: TOTAL_time= ON_time+OFF_Time	>0.50%	Combustion mode dependent enabling flag	**NOX_S2_StBitChkEnblCmbMode**		
					Fuel request: a) fuel request derivative is within a range	<= 35.00 mm^3/s >= -50.00 mm^3/s >5.00 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

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 invalid data failure on NOx2 CAN frames	>-1 mm^3 >11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B == FALSE > 9.90 V TRUE N0X_N0x2_StBitChkFlt ==FALSE N0X_Snsr2_FltSt ==FALSE **NOX_S2_OutRngMinCmbMode** OXY_NOx2ChkLoadFlt ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_B == 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 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: NOx raw read	 >2,990 ppm	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 Engine running for a time longer than No invalid data failure on NOx2 CAN frames One of the following conditions is fulfilled (OR logic): a) Air system control is active b) DEF system is ready to	>11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_B == FALSE > 9.90 V TRUE N0X_N0x2_StBitChkFlt ==FALSE N0X_Snsr2_FltSt ==FALSE **NOX_S2_OutRngMaxCmbMode** OXY_NOx2ChkLoadFlt ==FALSE > Os CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE TRUE TRUE	Time counter: 360 fails out of 720 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.
					inject and DEF strategy for emission reduction inhibition is not requested in case of DPF clogging			

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	>11.00V	Time counter: 80 fails out of 160 samples Task=25ms	Type A, 1 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_B	FALSE		
					Sensor supply in range	> 9.90 V		
					CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

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	>11.00V	Time counter: 80 fails out of 80 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	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

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	>11.00V	Time counter: 160 fails out of 160 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	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_B	FALSE		

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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 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	<0.06 >- 0.06	Powertrain relay voltage CAN_LostComm_FltN_BusB_NOxSnsr_B 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 a) Combustion mode dependent enabling flag b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V FALSE TRUE > 45 sec > 180 sec > 5 sec **NOX_S2_HtrPerfEnblCmbMode** > Osec FALSE	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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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.
02 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 2	P22B6	This DTC detects if 02 signal is lower than physical minimum value.	02 signal lower than a minimum value	< -6.00 [%]	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.
O2 Sensor Pumping Current Trim Circuit High Bank 1 Sensor 2	P22B7	This DTC detects if O2 signal is higher than physical maximum value	O2 signal higher than a maximum value	> 29.00 [%]	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 >100.00%	Engine is running	TRUE	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 2 test per trip are allowed 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. The filter gain calibration (1) can assume the following values: -0.70 if FIR is active - 0.22 if RR is active -0.28 if neither FIR and RR are active (1)The EWMA	Type A, 1 Trips
					Powertrain relay voltage	>11.00V		
					No failure on any NOx model inputs	EXM_NOxMdl_ExhMnfdNotVld ==FALSE		
					No failure on NOx1 CAN communication	CAN_LostComm_FltN_BusB_NOxSnsr_A ==FALSE		
					No invalid data failure on NOx1 CAN frames	CAN_InvalidDataFlt_BusB_NOxSnsr_A == FALSE		
					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		
					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		
					No failure on engine			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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.	< 5 ppm		
					b) condition a) is fulfilled for time	>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^A3 <42mm^A3		
					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		
					DFCO by-pass not enabled	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 1000ppm. 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 invalid data failure on N0x2 CAN frames 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 CAN_InvalidDataFlt_BusB_NOxSnsr_B == FALSE 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	> 9.90 V		
					N0x2 sensor dewpoint is reached	TRUE		
					(N0x2 Sensor heater raw resistance - N0x2 Sensor heater target resistance) / N0x2 Sensor heater target resistence	<0.06% >- 0.06%		
					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	>-20 °C <400 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					SCR)	< 20 g/s		
					g) exhaust mass flow	> 5 sec		
					h) conditions f) g) are fulfilled for time	> 10 %		
					j) 02 concentration from N0x1	<1,000 ppm		
					k) NOx concentration from N0x1	>0sec		
					i) conditions j) k) are fulfilled for time	< 1 %		
					l) duty cycle applied to the HC injector driver	> 5 sec		
					m) condition l) is fulfilled for time	> 15 sec		
					n) time between key off and last overrun	> 200 sec		
					o) time between key off and last DPF regen	< 800 rpm		
					p) engine speed in idle range	<20 mm^3		
					q) fuel request in idle range	< 1,800 sec		
					r) conditions p) q) is fulfilled for time			
					s) timer of condition r) is reset if one of the following condition is fulfilled (idle off recoqnition - t)	>-20°C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					conditions): s.1) exhaust temperature (downstream SCR) s.2) condition s.1) is fulfilled for time (once idle has been detected) s.3) vehicle speed s.4) condition s.3) is fulfilled for time (once idle has been detected) s.5) exhaust mass flow s.6) condition s.5) is fulfilled for time (once idle has been detected) t) HC mass flow (SCR downstream) Once t) condition is fulfilled the following additional t.x) conditions shall be fulfilled to enable the monitor (AND logic) t.1) exhaust temperature (downstream SCR) t.2) condition t.1) is fulfilled for time (once condition t) has been detected) t.3) vehicle speed t.4) condition t.3) is	> 5 sec > 5mph > 5 sec > 30 g/sec > 5 sec < 5g/s > -20 g/s > 22 sec >= 5 mph > 10 sec > 22 a/s		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					fulfilled for time (once condition t) has been detected) t.5) exhaust mass flow t.6) condition t.5) is fulfilled for time (once condition t) has been detected) u) deceleration before keyoff. v) condition u) could be ignored if idle engine condition v.x) is fulfilled v.1) engine speed in idle range v.2) condition v.1) fulfilled for time w) DFCO by-pass not enabled Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off when following conditions are fulfilled: x) 02 stabilization timer y) 02 concentration from N0x2	> 5 sec < 4.00m/s^2 < 5.00 rpm < 10.00 rpm > 8.00s TRUE > 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	>99.83 [%]	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	<0.02 [%]	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;	LEV_DfltPstnNotRchdFlt ==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	300.00 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			
					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 set point 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C 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 FALSE > 9.90 V TRUE TRUE <0.06% >- 0.06% > 10.00 sec TRUE NOX_Snsr3_FltSt ==FALSE **NOX_S3_StBitChkEnblCmbMode** <= 35.00 mm^{A}3/s >= -50.00 mm^{A}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 invalid data failure on NOx3 CAN frames 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 >11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_C == FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_C == FALSE > 9.90 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: NOx raw read	 >2,990 ppm	Powertrain relay voltage NOx Sensor Bus relay is commanded ON No failure on NOx2 CAN communication No invalid data failure on NOx3 CAN frames 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 One of the following conditions is fulfilled (OR logic): a) Air system control is active b) DEF system is ready to inject and DEF strategy for emission reduction	>11.00V TRUE CAN_LostComm_FltN_BusB_NOxSnsr_C == FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_C == FALSE > 9.90 V TRUE N0X_N0x3_StBitChkFlt ==FALSE N0X_Snsr3_FltSt ==FALSE **NOX_S3_OutRngMaxCmbMode** OXY_NOx3ChkLoadFlt ==FALSE TRUE TRUE	Time counter: 120 fails out of 240 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.
					inhibition is not requested in case of DPF clogging			

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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 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	>11.00V	Time counter: 80 fails out of 80 samples Task=25ms	Type B, 2 Trips
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_C	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_C	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 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 160 fails out of 160 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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V FALSE	Time counter: 80 fails out of 160 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	<0.06 >- 0.06	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 a) Combustion mode dependent enabling flag b) condition a) is fulfilled for time CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V FALSE TRUE > 200 sec > 200 sec >5 sec **NOX_S3_HtrPerfEnblCmbMode** > Osec FALSE	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 < 9.90 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	>11.00V		
					NOx Sensor Bus relay is commanded ON	TRUE		
					a) NOx sensor Dewpoint is reached	TRUE		
					b) condition a) shall be fulfilled for time	>0sec		
					CAN_LostComm_FltN_BusB_NOxSnsr_C	FALSE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_C	FALSE		

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 CAN_InvalidDataFlt_BusB_NOxSnsr_C	>11.00V TRUE FALSE > 9.90 V TRUE FALSE	Time counter: 80 fails out of 80 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	>11.00V	Time counter: 160 fails out of 160 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
					NOx Sensor Bus relay is commanded ON	TRUE		
					CAN_LostComm_FltN_BusB_NOxSnsr_C	FALSE		
					Sensor supply in range	> 9.90 V		
					Sensor dewpoint is reached	TRUE		
					CAN_InvalidDataFlt_BusB_NOxSnsr_C	FALSE		

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 invalid data failure on N0x3 CAN frames 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	N0X_Snsr3_ElecFA ==FALSE NOX_NOx3_OutOfRngLo Fit ==FALSE N0X_N0x3_0ut0fRngHi Fit ==FALSE CAN_LostComm_FltN_BusB_NOxSnsr_C ==FALSE CAN_InvalidDataFlt_BusB_NOxSnsr_C ==FALSE 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	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.
					Speed sensor			
					No failure on any input of UF-SCR chemical model	SCR.ChemicalMdlFlt ==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	> 9.90 V		
					N0x3 sensor dewpoint is reached	TRUE		
					(N0x3 Sensor heater raw resistance - N0x3 sensor heater target resistance) / N0x3 sensor heater target resistence	<0.06% >- 0.06%		
					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	>-20 °C <400 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					sensor (downstream UF-SCR)			
					g) exhaust mass flow	< 20 g/s		
					h) conditions f) g) are fulfilled for time	> 5 sec		
					i) 02 concentration from N0x1	> 2 %		
					j) NOx concentration from N0x1	< 600 ppm		
					k) conditions i) j) are fulfilled for time	>0.00 sec		
					l) duty cycle applied to the HC injector driver	< 1 %		
					m) condition I) is fulfilled for time	> 5 sec		
					n) time between key off and last overrun	> 15 sec		
					o) time between key off and last DPF regen	> 200 sec		
					p) engine speed in idle range	< 800 rpm		
					q) fuel request in idle range	<20mm^3		
					r) conditions p) q) is fulfilled for time	< 1,800 sec		
					s) timer of condition r) 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):			
					s.1) exhaust temperature (downstream UF-SCR)	>-20 °C		
					s.2) condition s.1) is fulfilled for time (once idle has been detected)	> 5 sec		
					s.3) vehicle speed	> 5mph		
					s.4) condition s.3) is fulfilled for time (once idle has been detected)	> 5 sec		
					s.5) exhaust mass flow	> 30 g/sec		
					s.6) condition s.5) is fulfilled for time (once idle has been detected)	> 5 sec		
					t) HC mass flow (UF-SCR downstream)	< 20g/s		
					Once t) condition is fulfilled the following additional t.x) conditions shall be fulfilled to enable the monitor (AND logic)			
					t.1) exhaust temperature (downstream UF-SCR)	> -20 g/s		
					t.2) condition t.1) is fulfilled for time (once condition t) has been detected)	> 20 sec		
					t.3) vehicle speed	>= 5 mph		
					t.4) condition t.3) is	> 10 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					fulfilled for time (once condition t) has been detected) t.5) exhaust mass flow t.6) condition t.5) is fulfilled for time (once condition t) has been detected) u) deceleration before keyoff v) condition u) could be ignored if idle engine condition v.x) is fulfilled v.1) engine speed in idle range v.2) condition v.1) fulfilled for time w) DFCO by-pass not enabled Once all conditions above are fulfilled during the driving cycle, ECM requires diagnostic test execution at key off when following conditions are fulfilled: x) 02 stabilization timer y) 02 concentration from N0x3	> 18g/s > 5 sec < 4.00m/s^2 < 5.00 rpm < 10.00 rpm > 15.00s TRUE > 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. 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). Each sample of the computed LP EGR Cooler Efficiency (before the average) is corrected by an offset depending on the LP EGR flow.	< 40.00 [%] **P241F: Efficiency Offset [%]**	Calibration on diagnostic enabling PT Relay voltage in range Engine is running or cranking Difference between LP EGR cooler upstream temperature and LPE cooler inlet coolant temperature Ambient Temperature Ambient pressure Air Control is Active Engine Coolant Temperature (OR OBD Coolant Enable Criteria), AND Engine Coolant Temperature LP EGR flow (filtered) in range, with hysteresis on	1.00==TRUE Powertrain relay voltage > 11.00 [V] ==TRUE > 120.00 [°C] < 300.00 [°C] >= -20.00 [°C] >= 69.60 [kPa] Refer to "Air Control Active" Free Form > 60.00 [°C] ==TRUE < 130.00 [°C] > 5.00 [g/s] (ENABLE) < 2.00 [g/s] (DISABLE)	Test executed after 200.00 samples are collected and their average is computed 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.
					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 Circuit Range/ Performance Bank 1 Sensor 3	P242B	the test compare (the difference between a max temperature calculated for a calibratable time and the temperature at key on define after a calibratable soaking time) with a calibratable map function of temperature freezed at rising edge of the enabling condition met. if there difference is below this calibratalbe Map a issue is detected. The failure mode capable to detect is sensor out of the pipe, or information stuck for other motivation.	The difference between the max temperature calculated for a calibratable time and the temperature frozen after a soaking time is less	< **EGT_Bank1_Sensor3 _Temp MAP**	Monitor enabled by dedicated calibration	1.00	no debounce	Type B, 2 Trips
					Engine in not run mode for a calibratale time	>10,800.00		
					Engine not run timer error	==FALSE		
					Diag system disable	==FALSE		
					Run cranck in range	==TRUE		
					Engine Run	==TRUE		
					No lost comm /check hi/ check low / quick change puntual errore present	==TRUE		
					Diagnosis not abborted	==TRUE		
					No report done	==TRUE		
					No Key on fault	EGT_KOD_B1S3_FA		
					No quick change fault	EGT_QED_B1S3_FA		
					no out of range high fault	EGT_CED_B1S3_HiFA		
					no out of range low fault	EGT_CED_B1S3_LoFA		
					no lost of comm fault	EGT_CED_B1S3_LostCommFA		
					no fault affected engine not run timer	==TRUE		
					AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

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 is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature velue in case of digital sensor) with a minimum threshold.	**Analog sensor:** 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. **Digital termocouple sensor:** The monitor compares the EGT 3 raw value (temperature value) with a minimum threshold;	<0.00 [Ohm] <-72.80 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status AND lost communication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail samples over 25.00 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 is applicable for an analog and digital termocouple sensor. Has the purpose of warning the system driver that an electrical failure affects the temperature sensor in case of analog sensor, in case of digital sensor is capable to detect issue in the wiring harness between the module and the probes. The monitor compares the EGT raw value (resistance value or a temperature value in case of digital sensor) with a maximum threshold.	**Analog sensor:** 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. **Digital termocouple sensor:** The monitor compares the EGT 3 raw value (temperature value) with a maximum threshold;	>100,000,000.00 [Ohm] > 1,289.00 [°C]	Monitor enabled by dedicated calibration AND Engine cranking AND Supply voltage in range AND Ignition run crank active AND Diagnostic system reset status loss comunication error AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 [Boolean] == FALSE == TRUE == TRUE == FALSE == FALSE ==TRUE	19.00 fail 25.00 samples over 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 Absolute EGT temperature sensor raw difference value	> 100.00 [C]	Monitor enabled by dedicated calibration AND RunCrankIgnInRang AND RunCrankActive AND DiagSystemDsbl AND EngModeCrank AND Lost Communication Error AND No electrical fault affecting the sensor AND Unfiltered temperatature	1.00 [Boolean] ==TRUE ==TRUE ==FALSE ==FALSE ==FALSE EGT_ExhGas3_Flt >=140.00 <=1,070.00	12.00 fail samples out of 25.00 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.
					AND A calibratable delay time for the sensor initialization shall be elapsed	==TRUE		

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	0.00 ==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.
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 the Ranked 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	>= 7.25 >= 7.59 >= 7.59	Test enabled by calibration A new DPF regeneration is started The number of regenerations completed successfully is The previous regeneration was completed successfully The regeneration is started by the Ranked soot model, distance or time criteria (in the case of distance and time the ranked model percentage must be greater than a calibratable threshold) The regeneration is requested at service The regeneration is requested in advance due to a failure condition The Ranked soot model was valid for the whole duration of the soot loading phase	1.00 == TRUE >0.00 == TRUE == TRUE (>0.00) == FALSE == FALSE DPF_RankedModelNotVId EXM_PM_TurbFlowNotVId_2 = FALSE >11.00V	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.
					The nominal engine out soot model was valid for the whole duration of the soot loading phase Run/Crank voltage in range Extreme transient engine operation was not detected, i.e. the delta fuel request during the soot loading time was During the previous regeneration more than 50 % of the time was not spent at ambient pressure During the previous regeneration the cumulative elevation gain is	< 100.00 mm3/s < 74.00 < -30.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Diesel Particulate Filter Soot Accumulation	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) AND DPF_DPF_St = CeDPFR_e_SootLoading) (Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St != CeDPFR_e_SootLoading) Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 130.00 [Pct] > 150.00 [Pct]	Test enabled by calibration No fault on DPF pressure sensor (electrical, rationality and offset) No fault on upstream DPF temperature sensor (electrical and rationality; if not present, no fault on downstream catalyst temperature sensor) with the exception of the fault on downstream DPF temperture sensor No fault on air flow meter No fault on atmospheric pressure sensor Engine speed No fault on exhaust mass flow estimation	1.00==TRUE EGP_DiffPresSnsrFlt ==FALSE EGT_SnsrDPF_UpFlt ==FALSE (if sensor not present, EGT_SnsrCatDwnFlt ==FALSE) Exception: above condition ==TRUE AND EGT_SnsrDPF_DwnFlt ==TRUE MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 500.00 [rpm] EXF_TotExhDPF_UpFA ==FALSE > 35.00 [l/s]	If DPF_DPF_St = CeDPFR_e_SootLoading 120.00 failures over 150.00 samples elseif DPF_DPF_St != CeDPFR_e_SootLoading 120.00 over 150.00 samlples 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.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	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		
					Icing risk for delta pressure sensor's pipes is low	== TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Closed Loop DPF Regeneration Control At Limit - Temperature Too Low	P24A0	DPF Control Temperature Deviation diagnostic monitors the exhaust gas temperature downstream the 1st ccDOC 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 Regeneration state in warm up DPF Mode DPF temperature closed loop control shall be enabled Battery voltage No fault on exhaust mass flow No Fault on DOC downstream temperature sensor (only SCR forward architectures) No Fault on DPF upstream temperature model (only SCRF architectures) No Fault on DPF upstream temperature sensor (only DPF forward architectures) No Fault on ambient temperature sensor (only SCR forward	1.00 [Boolean] ==TRUE DPF_DPF_St== WarmJJp EGT_DsblCL== Enable temperature Closed loop control [Boolean] > 11.00 [V] EXM_TurbFlowNotValid [Boolean] ==FALSE EGT_SnsrCatDwnFlt [Boolean] ==FALSE EGT_TempDPF_UpFlt [Boolean] ==FALSE EGT_SnsrDPF_UpFlt [Boolean] ==FALSE OAT_PtEstFiltFA [Boolean] ==FALSE	850.00 fail samples out of 1,000.00 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.
					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)	EGT_TempDPF_UpFlt [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 DPF Regeneration Control At Limit - Temperature Too High	P24A1	DPF Control Temperature Deviation diagnostic monitors the exhaust gas temperature downstream the 1st ccDOC 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)	< -100.00 [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)	EGT_TempDPF_UpFlt [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.
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) AND DPF_DPF_St = CeDPFR_e_SootLoading) (Soot model based on Delta pressure measure plus configurable correction block (CCB) AND DPF_DPF_St != CeDPFR_e_SootLoading) Soot model based on Delta pressure measure plus configurable correction block (CCB) Soot model based on Delta pressure measure plus configurable correction block (CCB)	> 300.00 [Pct] >320.00 [Pct]	Test enabled by calibration No fault on DPF pressure sensor (electrical, rationality and offset) No fault on upstream DPF temperature sensor (electrical and rationality; if not present, no fault on downstream catalyst temperature sensor) with the exception of the fault on downstream DPF temperture sensor No fault on air flow meter No fault on atmospheric pressure sensor Engine speed No fault on exhaust mass flow estimation	1.00==TRUE EGP_DiffPresSnsrFlt ==FALSE EGT_SnsrDPF_UpFlt ==FALSE (if sensor not present, EGT_SnsrCatDwnFlt ==FALSE) Exception: above condition ==TRUE AND EGT_SnsrDPF_DwnFlt ==TRUE MAF_MAF_SnsrFA ==FALSE AND MAF_MAF_SnsrTFTKO ==FALSE AmbPresDfltdStatus = CeAAPR_e_AmbPresNotDfltd > 500.00 [rpm] EXF_TotExhDPF_UpFA ==FALSE > 35.00 [l/s]	If DPF_DPF_St = CeDPFR_e_SootLoading 20.00 failures over 30.00 samples elseif DPF_DPF_St != CeDPFR_e_SootLoading 20.00 failures over 30.00 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.
					Exhaust gas volume flow greater than a calibrateable threshold for more than a calibratable time	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		
					Icing risk for delta pressure sensor's pipes is low	==TRUE		

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 state machine command (ECM) is different from SCU feedback		Soot Sensor bus relay is commanded on for a time No electrical fault active on Soot Sensor bus relay No faults of CAN communication loss with Soot Sensor Transmission fault with sensor control unit not present Soot sensor state machine command is different from initialization state or error state Time between states transition	> 5.00 NOT(SBR_RlyFA) NOT(U02A3) NOT(P30BC) > 125.00	Time counter: 200.00 failures out of 250.00 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 Circuit Low	P24B0	This diagnosis detects an open circuit on the soot sensor electrode signal or a cracked electrode	Soot Soot Electrode raw current measured at setpoint temperature 1 - Soot Soot Electrode raw current measured at setpoint temperature 2	<2.00	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 faults present on Soot Sensor Soot Sensor is in regeneration phase Soot Sensor Electrode current measurement enabled Transmission fault with sensor control unit not present Sensor is commanded in a regeneration state	 NOT(SBR_RlyFA) NOT (SOT_SootSnsr_SrlLcFA) NOT(SOT_EleclFlt) NOT (SOT_SootSnsr_SrlFsFA)		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: 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 IDE Temperature is lower than In case of overthreshold event the diagnostic will be re-enabled by passing (hysteresis)	 NOT(SBR_RlyFA) NOT(U02A3) NOT(P1473) 459.98 450.00	Time counter: 24.00 consecutive failures OR 24.00 failures out of 92.00 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 Number of SCG error events	 1< 0.5 A OR 1> 15A > 100	Soot Sensor Control Unit conditions: Soot Sensor Heater Commanded on, i.e., heater duty cycle 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(P1473)	Time counter: 9.00 consecutive failures OR 9.00 failures out of 32.00 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.
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	> 60.00 kPa		
					Ambient air temperature	> -20.00 °C		
					Exhaust gas volumetric flow at soot sensor)	> 25.00 mg/s		
					Time after sensor regeneration	>120.00 s OR > 100.00 °C		
						> 150.00 °C		
						NOT(P30BC)		
					Temperature estimated by the sensor probe temperature model - Electrode temperature	> 150.00		

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 Heating during measurement is not active or heater off condition			

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 Soot Sensor Temperature meander (TM) refernce voltage signal	<0.3 V OR > 3.5 V <4.5 V	Soot Sensor Control Unit conditions: No conditions 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(P1473)	Time counter: 24.00 consecutive failures OR 24.00 failures out of 96.00 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	<= (725.00 -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 < 5.00s 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 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.
Particulate Matter Sensor Exhaust Sample Error Bank 1 - (EWMA filter used)	P24DA	This diagnosis detects a soot sensor that has been removed from exhaust line or is clogged	{Heater power filtered using EWMA filter is} OR {Particulate Matter Sensor Exhaust Sample Error Bank 1 previously detected (TRUE -> fault active) AND Heater power filtered using EWMA filter is}	< 1.04 SOT_SnsrB_ExhGasInChkFA == TRUE < 1.04	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 Diagnostic active only during Soot Sensor protection heating phase OR during Soot Sensor protection heating phase	> 11.00 NOT(SBR_RlyFA) (U02A3) NOT(P24DO) NOT(SOT_ElecIFlt) SOT_ExhPresSootSnsrVld SOT_ExhTempSootSnsrVld SOT_TotExhSootSnsrVld 0.00	No debounce time	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					and Soot sensor regeneration phase			
					Derivative in volumetric flow	2.00 < d2V < 300.00		
					for a time	> = 0.45 s		
					At 1nitCntrlr time since engine off	> 21,600.00 s		
					At 1nitCntrlr time since engine off is valid	NOT EngineModeNotRunTimer Error		
					The time from the Soot Sensor Heater is controlled in closed loop	> 47.00 s		
					As soon as Soot Sensor is supplied the time since PM sensor heating off (module off plus heating off)	> 540.00 s		
					Exhaust gas temperature at Soot Sensor	-20.00 < T <230.00 °C		
					Environmental pressure	> 70.0 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 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 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	== 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 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.
02 Sensor Pumping Current Trim Circuit Low Bank 1 Sensor 1	P2627	This DTC detects if 02 signal is lower than physical minimum value.	02 signal lower than a minimum value	< -6.00 [%]	Engine running		Time counter: 100 failures out of 200 samples. Time task 25[ms]	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_NOx1_O2_RawNotRib == FALSE		
					Enabled in combustion mode	refer to supporting table **KaOXYD_b_NOx1SigRn (gEnblCmbMode**)		
					No pending or confirmed DTC	NOX_Snsr1_NotVld		

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 High Bank 1 Sensor 1	P2628	This DTC detects if O2 signal is higher than physical maximum value.	O2 signal higher than a maximum value	> 29.00 [%]	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 OR0.00)	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 OR0.00)	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 OR0.00)	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 OR0.00)	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 OR0.00)	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 OR0.00)	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	480.00 fail counts out of 600.00 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.
Cold Start Diesel Intake Air Flow "A" Control Performance	P2957	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 [%]	Cold Start strategy enabled	== TRUE	960.00 fail counts out of 1,200.00 sample counts Function task: 6.25 ms	Type A, 1 Trips
					Test enabled by calibration	==1.00		
					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)	>=0.00 [°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]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Outside air temperature breakpoint for minimum engine coolant temperature enable	>= -20.00 [°C]		
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					Throttle position setpoint in steady state conditions for minimum time	> -100.00 [%/s] < 100.00 [%/s] for >= 0.30 [s]		
					Throttle position closed loop control active			
					No mechanical stop soft approach in progress			
					No faults present on Throttle position sensor, Throttle valve, Throttle position control deviation			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start TurbochargerVGTA Performance	P2958	This monitor detects an obstruction on the actuator (obstruction found during the vanes opening orclosing) 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 [%]	Cold Start strategy enabled	== TRUE	960.00 fail counts out of 1,200.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	== 1.00		
					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)	>= 40.00 [°C]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults present on engine coolant temperature sensor	ECT_Sensor_FA ==FALSE		
					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.
Cold Start Intake Manifold Runner Control Actuator Control Circuit Performance Bank 1	P295A	This monitor detects an obstruction on the actuator (obstruction found during valve opening orclosing) checking the setpoint position against the position measured by the Swirl Position Sensor.	|Valve Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 10.00 [%]	Cold Start strategy enabled	==TRUE	960.00 fail counts out of 1,200.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	==1.00		
					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)	>= 0.00 [°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]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					Swirl position setpoint in steady state conditions for minimum time	> -100.00 [%/s] < 100.00 [%/s] for >= 0.38 [s]		
					Svirl closed loop control active			
					No mechanical soft stop approach in progress			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Exhaust Pressure Control Valve "A" Range/ Performance	P295C	This monitor detects an obstruction on the actuator (obstruction found during the ETV opening orclosing) checking the setpoint position against the position measured by the Throttle Position Sensor.	|ETV Position Tracking Error| (setpoint position - measured position) > maximum threshold	> 10.00 [%]	Cold Start strategy enabled	== TRUE	960.00 fail counts out of 1,200.00 sample counts Function task: 6.25 ms	Type B, 2 Trips
					Test enabled by calibration	==1.00		
					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)	>= 0.00 [°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]		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No faults present on outside air temperature sensor	OAT_PtEstFiltFA ==FALSE		
					Throttle position setpoint in steady state conditions for minimum time	> -100.00 [%/s] < 100.00 [%/s] for >= 0.50 [s]		
					Throttle position closed loop control active			
					No mechanical stop soft approach in progress			

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 DFCO by-pass Strategy NOT active Stable fuel cut-off condition has been	> 11.00 [V] OXY_NOx1_O2_RawNotRib == FALSE refer to supporting table (**KaOXYD_b_NOx1LoadChkCmbModeEnbl**) 0 [boolean] NOX_Snsr1_NotVld NOX_Snsr1_PresFlt OXY_NOx1SignRngChkFlt OXY_O2_NOx1PlausMdlFit FHPJnj LeakageFA (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.
					reached i.e. following conditions are met for a calibrateable time: a. Engine speed in operating range b. EGR mass flow c. Injected fuel quantity in operating range d. Air mass per cylinder in operating range Estimated 02 concentration stable i.e. difference between initial and actual value Air mass flown since fuel cut-off condition	> 0.60 [s] > 1,000 [rpm] < 2,000 [rpm] < 1,000.00 [mg] > 10.00 [mm^3] < 50.00 [mm^3] > 380.00 [mg] < 1,500.00 [mg] < 0.50 [%] >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 02 measured value (A) from Sensor 1 02 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		Time counter: (120+1) failures out of 240 samples. Time task 25[ms]	Type B, 2 Trips
					System voltage in range	> 11.00 [V]		
					Sensor is fully operative	OXY_O2_NOx2_PresCmpNotRIb == FALSE		
					Sensor 1 is fully operative	OXY_O2_NOx1_PresCmpNotRIb == FALSE		
					No pending or confirmed DTCs	NOX_Snsr2_NotVld NOX_Snsr2_PresFlt OXY_NOx2SignRngChkFlt OXY_NOx1_O2_Flt (MAF_SensorFA AND MAF_SensorTFTKO)		
					DTC P2A00 is running	(see P2A00 Fault code)		
					Air mass flown since P2A00 enabled	>0.10 [g]		
					Air mass flown since P2A00 disabled	> 2.00 [g]		

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	> 6.00 [%] < -6.00 [%]	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_NOx3SignRngChkFIt OXY_NOx2_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	<4.80 [%5V] OR >14.70 [%5V] OR <82.50 [%5V] OR >96.50 [%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	<-6.00 [%]	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_SigR(ngEnblCmbMode**) 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	> 29.00 [%]	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_SigR(ngEnblCmbMode**) 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.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 3	U01D2	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Modulel or Module2, it detende at which module the EGT sensore is connected.	Message Faults OR Message Age	>0 >100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCranklgnln Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional 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.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 1	U061F	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Modulel or Module2, it detende at which module the EGT1 sensore is connected.	Message Faults OR Message Age	>0 >100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCranklgnIn Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional 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.
Lost Communication with Exhaust Gas Temperature Sensors Bank 1 Sensor 2	U0620	This function has the purpose to detect is there any problem of the SENT sensor wiring harness or sensor internal faults that cause the SENT signal to be switched off,sensor internal faults that cause the SENT protocol communication faults.In this case two DTC shall be set, the DTC relative to a Modulel or Module2, it detende at which module the EGT2 sensore is connected.	Message Faults OR Message Age	>0 >100.00 [s]	Monitor enable by a dedicated calibration AND RunCranckActive AND EngineModeCranck AND RunCranklgnIn Range AND Diagnostic System Disabled AND A calibratable delay time for the sensor initialization shall be elapsed	1.00 ==TRUE ==FALSE ==FALSE ==TRUE	19.00 fail sample out of 25.00 Functional 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.
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 EGR SENT position counters has been updated AND HWIO time counter since last valid HP EGR 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 "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 EGR SENT position counters has been updated AND HWIO time counter since last valid LP EGR 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 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 VGTSENT position counters has been updated AND HWIO time counter since last valid VGTSENT position was transmitted > threshold (age error = TRUE)))	 ------------- AND > 6.25 [ms]				

Initial Supporting table - EnginePointEnableDPFTempDeviation

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
65	0	0	0	0	0	0	0	0

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 - Ka0XYD_b_N0x1 LoadChkCmbModeEnbl

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	CeCMBR_e_FarInjection
1	1	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

KaOXYD_b_NOx1LoadChkCmbModeEnbl - Part 5

y/x				
1				

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	CeCMBR_e_FarInjection
1	1	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

KaOXYD_b_NOx1OvrnChkCmbModeEnbl - Part 5

y/x				
1				

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	CeCMBR_e_FarInjection
1	1	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

KaOXYD_b_NOx1SigRngEnblCmbMode - Part 5

y/x				
1				

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	CeCMBR_e_FarInjection
1	1	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

KaOXYD_b_NOx2SigRngEnblCmbMode - Part 5

y/x				
1				

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	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,500	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,750	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,000	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,500	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,750	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
3,000	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
3,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10

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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_NOx2SelfTstEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S1_OfstMntrEnblCmbMode

Description:

N0X_S1JDfstMntrEnblCmbMode - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	1	1	0

N0X_S1JDfstMntrEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

N0X_S1JDfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S1_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S1_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S1_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S1_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S1_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S1_PlausChkEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S1_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S2_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S2_OutRngMaxCmbMode

Description: Combustion mode dependent diag enable for Post Catalyst NOx Sensor OCR 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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S2_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S2_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S2_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S2_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S2_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - P0106, P2227, P227B, P00C7: 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	9	13	17	22	25	28	33
1	10	13	17	23	30	35	39	43

Initial Supporting table - PmpSpdPerfDiagDly

Description:

y/x	-20	-10	20	50	128
1	60	20	10	8	5

Initial Supporting table - PumpSpdPerfErrorLim

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 - SCR_Eff1_CombMode_Enbl

Description:

SCR_Eff1_CombMode_Enbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	1

SCR_Eff1_CombMode_Enbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

SCR_Eff1_CombMode_Enbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

SCR_Eff1_CombMode_Enbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - Alp>haDisagreement Limit

Description: Alpha Disagreement Limit

Value Units: Percent
X Unit: Percent
Y Units: Percent

y/x	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0
0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - BetaDisagreement Limit

Description: Beta Disagreement Limit

Value Units: Percent
X Unit: Percent
Y Units: Percent

y/x	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0
0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - DPFtoRichConversion

Description: This map converts the test result generated by the DPF regeneration portion to the rich combustion expected range.

y/x	1	2	3	4	5	6	7	8
1	1	1	1	1	1	1	1	1

Initial Supporting table - K EffExhFlowCond_RGN_SCR2

Description: Enablement table, function of exhaust flow upstream SCR2 and SCR2 average temperature [boolean] for SCR2 monitoring during DPF RGN (P134B)

Value Units: boolean
X Unit: °C
Y Units: g/s

y/x	400.00	401.00	440.00	460.00	480.00	500.00	520.00	540.00	560.00	580.00	600.00	620.00	630.00	640.00	650.00
10.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12.50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17.50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
25.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
30.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
40.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
50.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
60.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
70.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
80.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
90.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
100.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
120.00	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000
140.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Initial Supporting table - KaFADC_Cnt_SQP_PulsPerStrk

Description: Number of single injection pulses that shall be injected for each stroke. This label is function of SQP rail pressure level.

y/x	0	1	2	3	4	5
1	1	1	1	1	1	1

Initial Supporting table - KaFADC_n_SQP_HiThrshDelt

Description: Delta engine speed threshold to request SQP rail pressure set-point. This label is function of SQP rail pressure level.

KaFADC_n_SQP_HiThrshDelt - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4
1	100	100	100	100

KaFADC_n_SQP_HiThrshDelt - Part 2

y/x	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9	CeTGRR_e_TransGr10
1	100	100	100	100

KaFADC_n_SQP_HiThrshDelt - Part 3

y/x	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7
1	100	100	100	100

KaFADC_n_SQP_HiThrshDelt - Part 4

y/x	CeTGRR_e_TransGr8			
1	100			

Initial Supporting table - KaFADC_n_SQP_HysThrsh

Description: Hysteresis on Engine speed thresholds. This label is function of SQP rail pressure level.

KaFADC_n_SQP_HysThrsh - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4
1	50	50	50	50

KaFADC_n_SQP_HysThrsh - Part 2

y/x	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9	CeTGRR_e_TransGr10
1	50	50	50	50

KaFADC_n_SQP_HysThrsh - Part 3

y/x	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7
1	50	50	50	50

KaFADC_n_SQP_HysThrsh - Part 4

y/x	CeTGRR_e_TransGr8			
1	50			

Initial Supporting table - KaFADC_t_SQP_MaxAdptDeltET

Description: Maximum DeltaET that can be written in SQP NVM map. This value is also used for maximum authority monitoring.

y/x	0	1	2	3	4	5
1	179	111	92	69	58	46

Initial Supporting table - KaFADC_t_SQP_MinAdptDeltET

Description: Minimum DeltaET that can be written in SQP NVM map. This value is also used for maximum authority monitoring.

y/x	0	1	2	3	4	5
1	-133	-70	-63	-56	-53	-63

Initial Supporting table - KaFADD_Cnt_SQP_ECM_PulsStpET

Description: Number of injection pulses to be performed for each pressure level for quantity injected calculation (quantity averaged over this pulses).

y/x	0	1	2	3	4	5
1	10	10	10	10	10	10

Initial Supporting table - KaFADD_t_SQP_MaxRailPresTrsh

Description: Timer thresholds function of rail pressure levels to set the DTC of rail pressure deviation during cut-off diagnosis. Maximum SQP learning time acceptable for each rail pressure level.

y/x	0	1	2	3	4	5
1	150	150	150	150	150	150

Initial Supporting table - KaFADR_V_SQA_Test

Description: Target quantities to be injected during SQP. One for each rail pressure level.

y/x	CeFADR_e_SQA_LrnPres0	CeFADR_e_SQA_LrnPres1	CeFADR_e_SQA_LrnPres2	CeFADR_e_SQA_LrnPres3	CeFADR_e_SQA_LrnPres4	CeFADR_e_SQA_LrnPres5
1	2	2	2	3	3	4

Initial Supporting table - m_NH3_StrgMax_RGN_SCR2

Description: Upper boundary of SCR2 estimated NH3 storage [g] for SCR2 monitoring during DPF RGN (P134B)

Value Units: g
X Unit: °C
Y Units: g/s

y/x	10.00	20.00	30.00	40.00	50.00	60.00	80.00	100.00
400.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
425.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
450.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
500.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
550.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
575.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
600.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
625.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
650.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

Initial Supporting table - m_NH3_StrgMaxAge_RGN_SCR2

Description: Upper boundary of SCR2 estimated NH3 storage [g] for SCR2 monitoring during DPF RGN (P134B) when SCR2 catalyst is aged

Value Units: g
X Unit: °C
Y Units: g/s

y/x	10.00	20.00	30.00	40.00	50.00	60.00	80.00	100.00
400.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
425.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
450.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
500.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
550.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
575.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
600.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
625.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
650.00	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

Initial Supporting table - m_NH3_StrgMin_RGN_SCR2

Description: Lower boundary of SCR2 estimated NH3 storage [g] for SCR2 monitoring during DPF RGN (P134B)

Value Units: g
X Unit: °C

y/x	400.00	425.00	450.00	500.00	550.00	600.00	625.00	650.00
1.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Initial Supporting table - m_SlipN0xIntglThrsh_RGN_SCR2

Description: Disabling timer based on the time derivative of SCR2 average temperature [s] for SCR2 monitoring during DPF RGN (P134B)

Value Units: s
X Unit: °C/s

y/x	400.00	500.00	600.00	650.00
1.00	2,000.0000	2,000.0000	2,000.0000	2,000.0000

Initial Supporting table - NOX_S1_HtrPerfEnblCmbMode

Description:

NOX_S1_HtrPerfEnblCmbMode - 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_HtrPerfEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S1_HtrPerfEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S1_HtrPerfEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S2_HtrPerfEnblCmbMode

Description:

NOX_S2_HtrPerfEnblCmbMode - 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_HtrPerfEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S2_HtrPerfEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S2_HtrPerfEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - NOX_S3_HtrPerfEnblCmbMode

Description:

NOX_S3_HtrPerfEnblCmbMode - 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_HtrPerfEnblCmbMode - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S3_HtrPerfEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S3_HtrPerfEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

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	282	288	294	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	138	142	146	150

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	140	150	160	170	180	190	200	210	220	230	240	250	260	280	300
2,000	-15	-15	-16	-16	-16	-17	-17	-17	-18	-18	-18	-18	-19	-19	-20
2,250	-16	-16	-17	-17	-17	-18	-18	-18	-19	-19	-19	-19	-20	-20	-21
2,500	-16	-16	-17	-17	-17	-18	-18	-18	-19	-19	-19	-19	-20	-20	-21
2,750	-17	-17	-18	-18	-18	-19	-19	-19	-20	-20	-20	-20	-21	-21	-22
3,000	-17	-17	-18	-18	-18	-19	-19	-19	-20	-20	-20	-20	-21	-21	-22
3,400	-18	-18	-19	-19	-19	-20	-20	-20	-21	-21	-21	-21	-22	-22	-23
3,800	-19	-19	-20	-20	-20	-21	-21	-21	-22	-22	-22	-22	-23	-23	-24
4,200	-20	-20	-21	-21	-21	-21	-22	-22	-22	-22	-23	-23	-23	-24	-24
4,600	-21	-21	-22	-22	-22	-22	-23	-23	-23	-23	-24	-24	-24	-25	-25
5,000	-22	-22	-23	-23	-23	-23	-24	-24	-24	-24	-25	-25	-25	-26	-26

Initial Supporting table - P0234: Negative boost deaviation 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	140	150	160	170	180	190	200	210	220	230	240	250	260	280	300
2,000	-15	-15	-16	-16	-16	-17	-17	-17	-18	-18	-18	-18	-19	-19	-20
2,250	-16	-16	-17	-17	-17	-18	-18	-18	-19	-19	-19	-19	-20	-20	-21
2,500	-16	-16	-17	-17	-17	-18	-18	-18	-19	-19	-19	-19	-20	-20	-21
2,750	-17	-17	-18	-18	-18	-19	-19	-19	-20	-20	-20	-20	-21	-21	-22
3,000	-17	-17	-18	-18	-18	-19	-19	-19	-20	-20	-20	-20	-21	-21	-22
3,400	-18	-18	-19	-19	-19	-20	-20	-20	-21	-21	-21	-21	-22	-22	-23
3,800	-19	-19	-20	-20	-20	-21	-21	-21	-22	-22	-22	-22	-23	-23	-24
4,200	-20	-20	-21	-21	-21	-21	-22	-22	-22	-22	-23	-23	-23	-24	-24
4,600	-21	-21	-22	-22	-22	-22	-23	-23	-23	-23	-24	-24	-24	-25	-25
5,000	-22	-22	-23	-23	-23	-23	-24	-24	-24	-24	-25	-25	-25	-26	-26

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	140	150	160	170	180	190	200	210	220	230	240	250	260	280	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	2,000	2,250	2,500	2,750	3,000	3,400	3,800	4,200	4,600	5,000
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	75	85	95	100
1	172	172	172	172

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	75	85	95	100
1	142	142	142	142

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	143	145	147	149	151	153	155	157	159	161	163	165	167	169	171
1,300	28	32	32	34	35	38	40	44	43	43	43	43	44	46	47
1,340	22	31	31	33	35	35	35	38	38	38	38	38	38	38	43
1,380	18	20	23	25	26	26	28	31	31	33	33	34	35	35	39
1,420	16	18	23	23	23	25	26	26	26	27	27	28	28	30	34
1,460	15	18	21	21	21	21	21	21	22	24	25	25	25	25	28
1,500	15	15	15	15	16	17	18	19	20	21	22	22	23	24	24
1,540	15	15	15	15	16	16	16	17	18	19	18	19	18	18	18
1,580	14	15	17	17	16	15	15	16	16	17	16	15	17	17	18
1,620	13	13	10	10	12	12	11	9	9	9	9	11	11	11	12
1,660	10	10	5	7	8	8	5	5	7	10	10	10	9	7	8

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	143	145	147	149	151	153	155	157	159	161	163	165	167	169	171
1,300	21	22	22	24	26	28	30	31	32	33	34	35	36	37	38
1,340	20	22	22	23	25	26	27	28	29	31	31	33	34	35	36
1,380	19	22	22	23	23	24	26	28	28	30	31	32	33	34	35
1,420	19	21	22	23	23	23	24	27	27	29	30	31	32	33	34
1,460	19	21	22	23	23	23	24	26	26	28	29	30	31	32	33
1,500	18	20	22	23	23	23	24	25	26	27	27	28	30	32	33
1,540	18	20	20	20	20	20	22	22	22	23	25	26	28	29	31
1,580	16	18	18	18	18	18	18	18	19	20	22	23	27	28	30
1,620	15	16	16	17	18	17	16	17	17	19	22	23	26	26	28
1,660	12	12	12	12	13	13	13	14	14	15	17	18	20	22	24

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	140	150	160	170	180	190	200	210	220	230	240	250	260	280	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	1,340	1,380	1,420	1,460	1,500	1,540	1,580	1,620	1,660
1	2	2	2	1	1	1	1	1	1	1

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	674	675	800	1,249	1,250	1,300	1,450	1,451
64	0	15	15	15	15	15	0	0
68	0	15	15	15	15	15	0	0
72	0	15	15	15	15	15	0	0
76	0	15	15	15	15	15	0	0
80	0	15	15	15	15	15	0	0
84	0	15	15	15	15	15	0	0
88	0	15	15	15	15	15	0	0
92	0	15	15	15	15	15	0	0
96	0	15	15	15	15	15	0	0
100	0	15	15	15	15	15	0	0
104	0	15	15	15	15	15	0	0

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	674	675	800	1,249	1,250	1,300	1,450	1,451
64	0	2	2	2	2	2	0	0
68	0	2	2	2	2	2	0	0
72	0	2	2	2	2	2	0	0
76	0	2	2	2	2	2	0	0
80	0	2	2	2	2	2	0	0
84	0	2	2	2	2	2	0	0
88	0	2	2	2	2	2	0	0
92	0	2	2	2	2	2	0	0
96	0	2	2	2	2	2	0	0
100	0	2	2	2	2	2	0	0
104	0	2	2	2	2	2	0	0

Initial Supporting table - P0401: Insufficient HP EGRflow monitor enabling

Description: Calibration map to choose if the insufficient HP EGR flow monitor is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P0401: Insufficient HP EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag
1	1	0	1	0	0	0

P0401: Insufficient HP EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0	0	0

P0401: Insufficient HP EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	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 monitor 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	674	675	800	1,249	1,250	1,300	1,450	1,451
64	0	56	56	56	56	56	0	0
68	0	56	56	56	56	56	0	0
72	0	56	56	56	56	56	0	0
76	0	56	56	56	56	56	0	0
80	0	56	56	56	56	56	0	0
84	0	56	56	56	56	56	0	0
88	0	56	56	56	56	56	0	0
92	0	56	56	56	56	56	0	0
96	0	56	56	56	56	56	0	0
100	0	56	56	56	56	56	0	0
104	0	56	56	56	56	56	0	0

Initial Supporting table - P0402: Excessive HP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the excessive 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	674	675	800	1,249	1,250	1,300	1,450	1,451
64	0	0	0	0	60	60	86	0
68	0	0	0	0	60	60	86	0
72	0	0	0	0	60	60	86	0
76	0	0	0	0	60	60	86	0
80	0	0	0	0	60	60	86	0
84	0	0	0	0	60	60	86	0
88	0	0	0	0	60	60	86	0
92	0	0	0	0	60	60	86	0
96	0	0	0	0	60	60	86	0
100	0	0	0	0	60	60	86	0
104	0	0	0	0	60	60	86	0

Initial Supporting table - P0402: Excessive HP EGR flow Min fuel enabling condition

Description: Minimum desired fuel above which the excessive 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	674	675	800	1,249	1,250	1,300	1,450	1,451
64	100	100	100	100	33	33	33	100
68	100	100	100	100	33	33	33	100
72	100	100	100	100	33	33	33	100
76	100	100	100	100	33	33	33	100
80	100	100	100	100	33	33	33	100
84	100	100	100	100	33	33	33	100
88	100	100	100	100	33	33	33	100
92	100	100	100	100	35	35	35	100
96	100	100	100	100	35	35	35	100
100	100	100	100	100	35	35	35	100
104	100	100	100	100	35	35	35	100

Initial Supporting table - P0402: Excessive HP EGR flow monitor enabling

Description: Calibration map to choose if the excessive HP EGR flow monitor is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P0402: Excessive HP EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag
1	1	0	0	0	0	0

P0402: Excessive HP EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmIlp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0	0	0

P0402: Excessive HP EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0	0	0		

Initial Supporting table - P0402: Maximum desired HP EGR flow

Description: Maximum desired HP EGR flow below which the excessive HP EGR flow monitor 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	674	675	800	1,249	1,250	1,300	1,450	1,451
64	4	4	4	4	4	4	4	4
68	4	4	4	4	4	4	4	4
72	4	4	4	4	4	4	4	4
76	4	4	4	4	4	4	4	4
80	4	4	4	4	4	4	4	4
84	4	4	4	4	4	4	4	4
88	4	4	4	4	4	4	4	4
92	4	4	4	4	4	4	4	4
96	4	4	4	4	4	4	4	4
100	4	4	4	4	4	4	4	4
104	4	4	4	4	4	4	4	4

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: 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	679	680	990	1,300	1,301	1,446	1,633	1,800
69	0	0	0	0	0	0	0	0
70	0	61	61	61	61	61	61	0
72	0	61	61	61	61	61	61	0
76	0	61	61	61	61	61	61	0
80	0	61	61	61	61	61	61	0
84	0	61	61	61	61	61	61	0
88	0	61	61	61	61	61	61	0
92	0	61	61	61	61	61	61	0
96	0	61	61	61	61	61	61	0
100	0	61	61	61	61	61	61	0
104	0	61	61	61	61	61	61	0

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	679	680	990	1,300	1,301	1,446	1,633	1,800
69	100	100	100	100	100	100	100	100
70	100	40	40	40	40	40	40	100
72	100	40	40	40	40	40	40	100
76	100	40	40	40	40	40	40	100
80	100	40	40	40	40	40	40	100
84	100	40	40	40	40	40	40	100
88	100	40	40	40	40	40	40	100
92	100	40	40	40	40	40	40	100
96	100	40	40	40	40	40	40	100
100	100	40	40	40	40	40	40	100
104	100	40	40	40	40	40	40	100

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	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag
1	1	0	1	0	0	0

P049B: Insufficient LP EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmllp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0	0	0

P049B: Insufficient LP EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0	0	0		

Initial Supporting table - P049B: Minimum desired LP EGR flow

Description: Minimum desired LP EGR flow above which the insufficient LP EGR flow monitor 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	679	680	990	1,300	1,301	1,446	1,633	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 - P049C: Excessive LP EGR flow Max fuel enabling condition

Description: Maximum desired fuel below which the excessive 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/x	679	680	990	1,300	1,301	1,446	1,633	1,800
69	0	16	16	16	0	0	0	0
70	0	16	16	16	0	0	0	0
72	0	16	16	16	0	0	0	0
76	0	16	16	16	0	0	0	0
80	0	16	16	16	0	0	0	0
84	0	16	16	16	0	0	0	0
88	0	16	16	16	0	0	0	0
92	0	16	16	16	0	0	0	0
96	0	16	16	16	0	0	0	0
100	0	16	16	16	0	0	0	0
104	0	16	16	16	0	0	0	0

Initial Supporting table - P049C: Excessive LP EGRflow Min fuel enabling condition

Description: Minimum desired fuel above which the excessive 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	679	680	990	1,300	1,301	1,446	1,633	1,800
69	100	1	1	1	100	100	100	100
70	100	1	1	1	100	100	100	100
72	100	1	1	1	100	100	100	100
76	100	1	1	1	100	100	100	100
80	100	1	1	1	100	100	100	100
84	100	1	1	1	100	100	100	100
88	100	1	1	1	100	100	100	100
92	100	1	1	1	100	100	100	100
96	100	1	1	1	100	100	100	100
100	100	1	1	1	100	100	100	100
104	100	1	1	1	100	100	100	100

Initial Supporting table - P049C: Excessive LP EGR flow monitor enabling

Description: Calibration map to choose if the excessive LP EGR flow monitor is enabled or not for each combustion mode.

Value Units: boolean
X Unit: enum

P049C: Excessive LP EGR flow monitor enabling - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag
1	1	0	1	1	0	0

P049C: Excessive LP EGR flow monitor enabling - Part 2

y/x	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManIRgn	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmllp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	0	0	0	0	0

P049C: Excessive LP EGR flow monitor enabling - Part 3

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich		
1	0	0	0	0		

Initial Supporting table - P049C: Maximum desired LP EGR flow

Description: Maximum desired LP EGR flow below which the excessive LP EGR flow monitor 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	679	680	990	1,300	1,301	1,446	1,633	1,800
69	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0
72	32	32	32	32	32	32	32	32
76	32	32	32	32	32	32	32	32
80	32	32	32	32	32	32	32	32
84	32	32	32	32	32	32	32	32
88	32	32	32	32	32	32	32	32
92	32	32	32	32	32	32	32	32
96	32	32	32	32	32	32	32	32
100	32	32	32	32	32	32	32	32
104	32	32	32	32	32	32	32	32

Initial Supporting table - P131E: Closed Loop Exhaust pressure too low correction

Description: Barometric pressure correction for OBDII Exhaust pressure too low monitor when ETV upstream pressure controller is in closed loop. It is function of barometric pressure.

Value Units: [-8, 8]
X Unit: kPa

y/x	63	68	72	76	80	84	88	92	96	100	105
1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P131E: Closed Loop Exhaust pressure too low Max fuel enabling condition

Description: Maximum desired fuel below which the Exhaust pressure too low monitor when ETV upstream pressure controller is in closed loop 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	1,200	1,250	1,350	1,500	1,650	1,750	1,850	2,000
64	35	35	35	35	35	35	35	35
68	35	35	35	35	35	35	35	35
72	35	35	35	35	35	35	35	35
76	35	35	35	35	35	35	35	35
80	35	35	35	35	35	35	35	35
84	35	35	35	35	35	35	35	35
88	38	38	38	38	38	38	38	38
92	40	40	40	40	40	40	40	40
96	40	40	40	40	40	40	40	40
100	40	40	40	40	40	40	40	40
104	40	40	40	40	40	40	40	40

Initial Supporting table - P131E: Closed Loop Exhaust pressure too low Min fuel enabling condition

Description: Minimum desired fuel above which the Exhaust pressure too low monitor when ETV upstream pressure controller is in closed loop 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	1,200	1,250	1,350	1,500	1,650	1,750	1,850	2,000
64	140	20	20	20	20	20	20	20
68	140	20	20	20	20	20	20	20
72	140	20	20	20	20	20	20	20
76	140	20	20	20	20	20	20	20
80	140	20	20	20	20	20	20	20
84	140	20	20	20	20	20	20	20
88	140	20	20	20	20	20	20	20
92	140	20	20	20	20	20	20	20
96	140	20	20	20	20	20	20	20
100	140	20	20	20	20	20	20	20
104	140	20	20	20	20	20	20	20

Initial Supporting table - P131E: Closed Loop Exhaust pressure too low threshold

Description: Exhaust back pressure error threshold for OBDII Exhaust pressure too low monitor when ETV upstream pressure controller is in closed loop. It is function of engine speed (X axis) and fuel request (Y axis).

Value Units: kPa
X Unit: rpm
Y Units: mm^3

y/x	1,200	1,250	1,350	1,500	1,650	1,750	1,850	2,000
15	1	1	1	1	1	1	1	1
17	1	1	1	1	1	1	2	2
23	1	1	1	1	1	2	2	2
25	1	1	1	1	2	2	2	3
27	1	1	1	1	2	2	2	3
30	1	1	1	1	2	2	3	3
33	1	1	1	2	2	2	3	3
35	1	1	2	2	2	2	3	3
40	2	2	2	2	2	2	3	3

Initial Supporting table - P131E: Desired Exhaust Backpressure Enable

Description: Desired exhaust back pressure threshold above which exhaust back pressure too low feedback control monitoring is enabled as a function of barometric pressure

Value Units: kPa
X Unit: kPa

y/x	64	68	72	76	80	84	88	92	96	100	104
1	66	70	74	78	82	86	90	94	98	102	106

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	699	700	1,060	1,420	1,780	2,140	2,500	2,501
68	0	0	0	0	0	0	0	0
70	0	60	60	60	60	60	60	0
72	0	60	60	60	60	60	60	0
76	0	60	60	60	60	60	60	0
80	0	60	60	60	60	60	60	0
84	0	60	60	60	60	60	60	0
88	0	60	60	60	60	60	60	0
92	0	60	60	60	60	60	60	0
96	0	60	60	60	60	60	60	0
100	0	60	60	60	60	60	60	0
104	0	60	60	60	60	60	60	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	699	700	1,060	1,420	1,780	2,140	2,500	2,501
68	70	70	70	70	70	70	70	70
70	70	0	0	0	0	0	0	70
72	70	0	0	0	0	0	0	70
76	70	0	0	0	0	0	0	70
80	70	0	0	0	0	0	0	70
84	70	0	0	0	0	0	0	70
88	70	0	0	0	0	0	0	70
92	70	0	0	0	0	0	0	70
96	70	0	0	0	0	0	0	70
100	70	0	0	0	0	0	0	70
104	70	0	0	0	0	0	0	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	7	7	7

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	699	700	1,060	1,420	1,780	2,140	2,500	2,501
68	0	0	0	0	0	0	0	0
70	0	25	25	25	25	25	25	0
72	0	25	25	25	25	25	25	0
76	0	25	25	25	25	25	25	0
80	0	25	25	25	25	25	25	0
84	0	25	25	25	25	25	25	0
88	0	25	25	25	25	25	25	0
92	0	25	25	25	25	25	25	0
96	0	25	25	25	25	25	25	0
100	0	25	25	25	25	25	25	0
104	0	25	25	25	25	25	25	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	699	700	1,060	1,420	1,780	2,140	2,500	2,501
68	70	70	70	70	70	70	70	70
70	70	3	3	3	3	3	3	70
72	70	3	3	3	3	3	3	70
76	70	3	3	3	3	3	3	70
80	70	3	3	3	3	3	3	70
84	70	3	3	3	3	3	3	70
88	70	3	3	3	3	3	3	70
92	70	3	3	3	3	3	3	70
96	70	3	3	3	3	3	3	70
100	70	3	3	3	3	3	3	70
104	70	3	3	3	3	3	3	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	5	5	5

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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	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_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

P14A5, P14A6: LP EGR slow response enabling - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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	700	950	1,500	2,000	2,500	3,000	3,500	4,000
68	10	10	10	10	10	10	10	10
70	50	50	50	50	50	10	10	10
72	50	50	50	50	50	10	10	10
76	50	50	50	50	50	10	10	10
80	50	50	50	50	50	10	10	10
84	50	50	50	50	50	10	10	10
88	50	50	50	50	50	10	10	10
92	50	50	50	50	50	10	10	10
96	50	50	50	50	50	10	10	10
100	50	50	50	50	50	10	10	10
104	50	50	50	50	50	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	700	950	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	12	12	12

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	700	950	1,500	2,000	2,500	3,000	3,500	4,000
68	0	0	0	0	0	0	0	0
70	0	90	90	90	90	0	0	0
72	0	90	90	90	90	0	0	0
76	0	90	90	90	90	0	0	0
80	0	90	90	90	90	0	0	0
84	0	90	90	90	90	0	0	0
88	0	90	90	90	90	0	0	0
92	0	90	90	90	90	0	0	0
96	0	90	90	90	90	0	0	0
100	0	90	90	90	90	0	0	0
104	0	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	700	950	1,500	2,000	2,500	3,000	3,500	4,000
68	70	70	70	70	70	70	70	70
70	70	0	0	0	0	70	70	70
72	70	0	0	0	0	70	70	70
76	70	0	0	0	0	70	70	70
80	70	0	0	0	0	70	70	70
84	70	0	0	0	0	70	70	70
88	70	0	0	0	0	70	70	70
92	70	0	0	0	0	70	70	70
96	70	0	0	0	0	70	70	70
100	70	0	0	0	0	70	70	70
104	70	0	0	0	0	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	16	16	16

Initial Supporting table - P16F3 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	616	390	261	202	166	142	127	114	104	96	90	84	79	75	72	68	65

Initial Supporting table - P16F3_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	616	390	261	202	166	142	127	114	104	96	90	84	79	75	72	68	65

Initial Supporting table - P16F3_EIA VSI safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on EIA Energizing Time compensation specific for VSI

P16F3_EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 1

y/x	13	27	42	57	72	87
1	616	390	261	202	166	142

P16F3_EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 2

y/x	102	116	131	146	161	176
1	127	114	104	96	90	84

P16F3_EIA VSI safety deadband threshold f(Fuel Rail Pressure) - Part 3

y/x	191	205	220	235	250	
1	79	75	72	68	65	

Initial Supporting table - P16F3 IBT safety deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on IBT Energizing Time compensation as function of Fuel Rail Pressure.

P16F3_IBT safety deadband threshold f(Fuel Rail Pressure) - Part 1

y/x	20	30	40	50	60	70
1	616	390	261	202	166	142

P16F3JBT safety deadband threshold f(Fuel Rail Pressure) - Part 2

y/x	80	90	100	110	120	130
1	127	114	104	96	90	84

P16F3JBT safety deadband threshold f(Fuel Rail Pressure) - Part 3

y/x	140	150	160	170	180	
1	79	75	72	68	65	

Initial Supporting table - P16F3_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 - P16F3_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 - P16F3_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 - P16F3_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	853	404	284	226	192	162	144	131	122	113	107	101

Initial Supporting table - P16F3_VCA safety max deadband threshold f(Fuel Rail Pressure)

Description: Maximum allowable safety deadband on VGA 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	308	195	130	101	83	71	63	57	52	48	45	42	40	38	36	34	32

Initial Supporting table - P16F3_VCA safety min deadband threshold f(Fuel Rail Pressure)

Description: Minimum allowable safety deadband on VGA 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	-308	-195	-130	-101	-83	-71	-63	-57	-52	-48	-45	-42	-40	-38	-36	-34	-32

Initial Supporting table - P1C30_CoilTemp2RatTempRef

Description:

X Unit: Ohm

y/x	-40	-30	-20	-10	0	10	20	30	40	50
1.0000000000	55	55	55	55	55	55	55	55	55	55

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 - t_DerTempDsblTmr_RGN_SCR2

Description: Disabling timer based on the time derivative of SCR2 average temperature [s] for SCR2 monitoring during DPF RGN (P134B)

Value Units: s
X Unit: °C/s

y/x	-10.00	-5.00	5.00	10.00	20.00	30.00	40.00	50.00
1.00	5.00	0.00	0.00	5.00	5.00	5.00	5.00	5.00

Initial Supporting table - T_MaxTempGrad_RGN_SCR2

Description: Upper boundary of SCR2 temperature gradient (difference between SCR2 upstream and SCR2 downstream temperature) [°C] for SCR2 monitoring during DPF RGN (P134B)

y/x	400.00	425.00	450.00	500.00	550.00	600.00	625.00	650.00
1.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00

Initial Supporting table - T_MinTempGrad_RGN_SCR2

Description: Lower boundary of SCR2 temperature gradient (difference between SCR2 upstream and SCR2 downstream temperature) [°C] for SCR2 monitoring during DPF RGN (P134B)

Value Units: °C
X Unit: °C

y/x	400.00	425.00	450.00	500.00	550.00	600.00	625.00	650.00
1.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00	-50.00

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)

UP Stream Stk Temp Vrtn - Part 1

y/x	-40	0	20	40
1	3	4	5	5

UP Stream Stk Temp Vrtn - Part 2

y/x	60	80	100	120
1	5	4	3	2

Initial Supporting table - CatCrtdMaxFuel

Description: Maximum integrated post injected fuel quantity threshold [g], as function of ambient temperature [K], needed to stop Catalyst integrators (heat and injected fuel) and calculate the Aging Index

y/x	250.00	266.00	282.00	298.00	314.00	330.00
1.00	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000

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	200	200	200	200	200	200	200	200

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 - P16F3 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	616	390	261	202	166	142	127	114	104	96	90	84	79	75	72	68	65

Initial Supporting table - EnginePointEnableDPFTempDeviation

Description: Map to enable DPF Control Temperature Deviation monitoring, function of engine speed and desired fuel.

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
65	0	0	0	0	0	0	0	0

Initial Supporting table - KtEffExhFlowCond_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	1	1	1	1	1	1	1	1	1	1	1	1	0	0
200	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0
210	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

KaOXYD_b_NOx3_SigRngEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

KaOXYD_b_NOx3_SigRngEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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	1	1	1	1	1	1	1	1

Initial Supporting table - m_NH3_StrgMax_SCR2

Description: Upper boundary of SCR2 estimated NH3 storage [g] for SCR2 monitoring (P2C7A)

Value Units: g
X Unit: °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
X Unit: °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_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_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	500	500	500	500

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 - 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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_NOx3SelfTstEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_NOx3SelfTstEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S3_OfstMntrEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S3_OfstMntrEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S3_OutRngMaxCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S3_OutRngMaxCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	1	1	1

NOX_S3_OutRngMinCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	1	1	1	0

NOX_S3_OutRngMinCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	0	0	0	0

NOX_S3_StBitChkEnblCmbMode - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

NOX_S3_StBitChkEnblCmbMode - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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	-20.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	13,020.0	13,020.0	10,450.0	7,890.0	6,170.0	5,315.0	2,400.0

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	-20.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	15,500.0	14,530.0	11,615.0	8,700.0	6,760.0	5,790.0	2,490.0

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	-20.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	15,500.0	14,530.0	11,615.0	8,700.0	6,760.0	5,790.0	2,490.0

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	-20.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	13,020.0	13,020.0	10,450.0	7,890.0	6,170.0	5,315.0	2,400.0

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	-20.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	15,500.0	14,530.0	11,615.0	8,700.0	6,760.0	5,790.0	2,490.0

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	-20.0	-5.0	10.0	25.0	35.0	40.0	57.0
1.0	15,500.0	14,530.0	11,615.0	8,700.0	6,760.0	5,790.0	2,490.0

Initial Supporting table - P01F01- 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	13.5	13.5	13.5	13.5	13.5
0.0	11.0	11.0	11.0	11.0	11.0
10.0	10.5	10.5	10.5	10.5	10.5
20.0	6.5	6.5	6.5	6.5	6.5
50.0	6.5	6.5	6.5	6.5	6.5

Initial Supporting table - P0126A: 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 - 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 - 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	170	100	55	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_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	0	0	0	0	0	0	25

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	50	50	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	-50	-50	-50	-50	-50	-50	-50	-50

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_WarmUp	CeCMBR_e_FarInjection
1	CeFADR_e_FSA_Grp1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd	CeFADR_e_FSA_GrpNotAllwd

KaFADR_e_FSA_ECM_CombModeGrp - Part 5

y/x				
1				

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	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,500	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,750	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,000	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,500	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,750	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
3,000	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
3,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10

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	4	4	5	6	12	16	14	8	8	8
1,200	5	6	6	8	11	15	12	11	11	11
1,300	6	7	8	9	11	14	12	11	11	11
1,400	6	7	8	10	11	12	12	11	11	11
1,500	5	6	7	8	11	12	11	10	10	10
1,600	6	5	7	9	11	13	10	9	9	9
1,700	7	7	7	9	11	12	11	10	10	10
1,800	8	7	7	8	10	12	11	7	7	7

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	-6	-6	-5	-6	-6	-8	-8	-8	-8
1,200	-6	-6	-6	-6	-6	-7	-8	-6	-6	-6
1,300	-6	-6	-6	-6	-7	-9	-9	-9	-9	-9
1,400	-6	-6	-6	-6	-8	-9	-9	-10	-10	-10
1,500	-6	-6	-7	-6	-8	-9	-9	-10	-10	-10
1,600	-6	-6	-7	-7	-8	-8	-10	-10	-10	-10
1,700	-6	-6	-6	-7	-9	-10	-11	-11	-11	-11
1,800	-6	-6	-6	-7	-8	-9	-9	-10	-10	-10

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 - EnginePointEnableDPFTempDeviation

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
65	0	0	0	0	0	0	0	0

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	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,500	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,750	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,000	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,500	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,750	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
3,000	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
3,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10

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 - P10D1_CoilTempRatTempRef

Description:

y/x	-40.0000000000	-30.0000000000	-20.0000000000	-10.0000000000	0.0000000000	10.0000000000	20.0000000000	30.0000000000	40.0000000000	50.0000000000
1	55	55	55	55	55	55	55	55	55	55

Initial Supporting table - DPSDPHDRatioThrsh

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 - DPS_DPL_Thrsh

Description:

y/x	0	100	150	200	250	300	350	400	500
0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0

Initial Supporting table - NOx2_Ofst_t_DsblTmTempUpSCR2_RDP2

Description: Disabling time based on SCR2 upstream temperature during RDP2 event [°C] to disable N0x2 offset monitoring after an RDP2 event.

Value Units: s
X Unit: °C

y/x	180	200	220	225	230	250	280	310	340	360
1	230	230	230	120	120	120	120	120	120	120

Initial Supporting table - EGT_Bank1_Sensor1_Temp MAP

Description:

y/x	-40	-8	24	56	88	120	148	152
1	190	158	126	94	62	30	2	0

Initial Supporting table - EGT_Bank1_Sensor2_Temp MAP

Description:

y/x	-40	-8	24	56	88	120	148	152
1	190	158	126	94	62	30	2	0

Initial Supporting table - EGT_Bank1_Sensor3_Temp MAP

Description:

y/x	-40	-8	24	56	88	120	148	152
1	190	158	126	94	62	30	2	0

Initial Supporting table - EGT_ERD_B1S1_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	60	60	100	60	100	100	100	100	100	60	60	100	100	60	60	60

Initial Supporting table - EGT_ERD_B1S1_CombModeEnbl

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_ERD_B1S2_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	60	60	150	60	150	150	150	150	150	60	60	150	150	60	60	60

Initial Supporting table - EGT_ERD_B1S2_CombModeEnbl

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - EGT_ERD_B1S3_CombModeDly

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	260	260	550	260	550	550	550	550	550	260	260	550	550	260	260	260

Initial Supporting table - EGT_ERD_B1S3_CombModeEnbl

Description:

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

P054EJFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	0

P054EJFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	0	0	0

P054EJFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

P054EJFM_CombModesEnbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	0	0

Initial Supporting table - P054E_IFM_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	700	1,000	1,200
-20	21	21	21	20	29
-10	18	18	18	16	21
0	4	4	4	6	9
20	4	4	4	6	9
40	3	3	3	5	7
70	3	3	3	5	7

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	700	1,000	1,200
-20	16	16	16	14	24
-10	13	13	13	11	16
0	3	3	3	3	3
20	3	3	3	3	3
40	2	2	2	2	2
70	2	2	2	2	2

Initial Supporting table - P054E_IFM_MinFuelIdleHC_G

Description: During HC Unloading combustion mode, this error threshold map indicates the rninimum 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	700	1,000	1,200
-20	4	4	4	4	4
-10	2	2	2	2	2
0	4	4	4	5	9
20	4	4	4	5	9
40	4	4	4	4	8
70	4	4	4	5	8

Initial Supporting table - P054EE_IFM_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	700	1,000	1,200
-20	4	4	4	4	4
-10	2	2	2	2	2
0	3	3	3	3	3
20	3	3	3	3	3
40	2	2	2	3	2
70	2	2	2	2	2

Initial Supporting table - P054 tE_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	700	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_IFM_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	700	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 - P054 tE_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	700	1,000	1,200
-20	13	13	13	14	19
-10	9	9	9	10	14
0	4	4	4	4	10
20	4	4	4	4	10
40	3	3	3	4	7
70	3	3	3	5	7

Initial Supporting table - P054E_IFM_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	700	1,000	1,200
-20	8	8	8	8	13
-10	11	11	11	9	12
0	3	3	3	3	3
20	3	3	3	3	3
40	2	2	2	2	2
70	2	2	2	2	2

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

P054FJFM_CombModesEnbl - Part 1

y/x	CeCMBR_e_CloseInjection	CeCMBR_e_SCR_WarmUp	CeCMBR_e_DOC_WarmUp	CeCMBR_e_FarInjection
1	1	0	1	0

P054FJFM_CombModesEnbl - Part 2

y/x	CeCMBR_e_HC_Unloading	CeCMBR_e_DOC_RichModeDiag	CeCMBR_e_DPF_AutoRgn	CeCMBR_e_DPF_ServManlRgn
1	1	0	0	0

P054FJFM_CombModesEnbl - Part 3

y/x	CeCMBR_e_DPF_Protection	CeCMBR_e_SCR_ServWarmUp	CeCMBR_e_SCR_ServCheck	CeCMBR_e_DOC_OverTemp
1	0	0	0	0

P054FJFM_CombModesEnbl - Part 4

y/x	CeCMBR_e_DPF_OverTemp	CeCMBR_e_LNT_DeNOx	CeCMBR_e_LNT_DeSOx_Lean	CeCMBR_e_LNT_DeSOx_Rich
1	0	0	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	700	1,000	1,200
-20	34	34	34	37	49
-10	32	32	32	34	41
0	31	31	31	35	42
20	21	21	21	27	36
40	20	20	20	26	33
70	16	16	16	19	22

Initial Supporting table - P054F=_IFM_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	700	1,000	1,200
-20	30	30	30	32	44
-10	27	27	27	29	36
0	23	23	23	25	24
20	19	19	19	21	21
40	17	17	17	18	18
70	12	12	12	12	12

Initial Supporting table - P054IF_IFM_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	700	1,000	1,200
-20	60	60	60	60	60
-10	60	60	60	60	60
0	29	29	29	33	40
20	27	27	27	32	37
40	23	23	23	28	33
70	20	20	20	23	26

Initial Supporting table - P054F : _IFM_MaxFuelIdleHC_PN

Description: During HC Unloading combustion mode, this error threshold map indicates the rnaximum 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	700	1,000	1,200
-20	60	60	60	60	60
-10	60	60	60	60	60
0	27	27	27	31	31
20	24	24	24	30	30
40	20	20	20	23	24
70	17	17	17	18	18

Initial Supporting table - P054IF_IFM_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	700	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=_IFM_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	700	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 - P054IF_IFM_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	700	1,000	1,200
-20	32	32	32	39	48
-10	29	29	29	35	43
0	27	27	27	33	41
20	26	26	26	32	39
40	25	25	25	31	38
70	22	22	22	28	32

Initial Supporting table - P054F=_IFM_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	700	1,000	1,200
-20	28	28	28	34	42
-10	30	30	30	34	32
0	25	25	25	28	29
20	25	25	25	29	28
40	22	22	22	25	26
70	18	18	18	19	20

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	5,067	6,400	6,500
1	68	268	268	268	118	68

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_Snsrllp = 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 - 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	0	125	200	250
1	15	155	230	270

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	5,067	6,400	6,500
1	68	268	268	268	118	68

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 - 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	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,500	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
1,750	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,000	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,500	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
2,750	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
3,000	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10
3,250	-8	-8	-8	-8	-10	-10	-10	-10	-10	-10

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 RGMXT05.333C	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	■HPIMU 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 Manufactures Enable Counter (MEC) K_Lateral_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.
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 Enablo	= 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 HP IMU Primary Yaw Rate Availability Indication HP IMU Primary Yaw Rate Failed Safety Fault Active HP IMU Primary Yaw Rate Failed Safety Indication HP IMU Secondary Yaw Rate Loss of Communication Fault Active HP IMU Secondary Yaw Rate Availability Indication HP IMU Secondary Yaw Rate Failed Safety Fault Active HP IMU Secondary Yaw Rate Failed Safety Indication HP IMU Common Diagnostic Enable HP IMU Signal Diagnostic Enable Yaw Rate Invalid Diagnostic	= 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.
					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_HP_IMU_Initialization_Delay	Diagnostic System Disabled	= FALSE	Continous	Safety Emissions Neutral Diagnostics - Special Type C
					Vehicle Power Mode	= Propulsion		
					Initialization Complete Diagnostic Communication Enable	= TRUE		
					K_Common_Diag_Enable	= TRUE		
					K_Communications_Fault_Pending	= FALSE		
					HP IMU Initialization Complete Loss of Communication Fault Active	= FALSE		
					HP IMU Initialization Complete Availability Indication	= Active		
					HP IMU Initialization Complete Failed Safety Fault Active	= FALSE		
					HP IMU Initialization Complete Failed Safety Indication	= FALSE		
					HP IMU Reset Occurred Loss of Communication Fault Active	= FALSE		
					HP IMU Reset Occurred Availability Indication is Available	= Active		
					HP IMU Reset Occurred Failed Safety Fault Active	= FALSE		

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: ■HP IMU 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 HP IMU 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 KeIDND_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: HPIDGJnitCmplt HPIDG_LoVltgDtd HPIDG_OrntnCalSts HPIDG_PriTemp HPIDG_RstOcc HPIDG SecTemp HPIDG_StcOfstCalSts HPIDG_LatAcce ICo rrSts 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_StrT rqAuth SteeringTorqueOverlayDeliveredAuth SteeringRequestDeliveredStatusAuth EPSTTDP_TotTorqDlvdAuth ArbitratedSteeringFeatureRequestActiveAuth Steering WheelHandsOffDetectionConfidenceLevelAuth Steering WheelHandsOffDetectionModeAuth SWHOP_StAuth SWIP_StrgWhlAngAuth SWIP_StrgWhlAngCalStsAuth SWI P_Strg WhlAngGradAuth	 > 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 BrkPedInitTrvlAchvd Auth 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
			ActAxleTrqAuth	6 out of 10 messages	PNC_ActiveTxPDUEnable (Any Partial Network that the ECU participates in is active)	= True		
			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_AccelPedOvrrdActvAuth	6 out of 10 messages				
			VMI1P_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	6 out of 10 messages				
			VSADP_VehSpdAvgDrvnAuth	3 out of 4 messages				
			VSNDP_VehSpdAvgNDrvnAuth	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 ABSFldAuth BrkPdlDrvAppPrsDetcdAuth BrkPdlDrvApplPresAuth TCSP_ESCActvAuth TCSP_ESCSysStsAuth TCSP_ActvAuth TCSP_DrvrlntntAuth 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_StrT rqAuth SteeringTorqueOverlayDeliveredAuth SteeringRequestDeliveredStatusAuth EPSTTDP_TotTorqDlvdAuth SteeringAssistStatusAuth SteeringAssistThermalInhibitedAuth Steering PerformanceActualModeAuth SteeringTorqueRequestOverlayAvailableLeftAuth SteeringTorqueRequestOverlayAvailableRightAuth SteeringWheelAngleIntegrityStatusAuth SteeringWheelTorqueIntegrityStatusAuth ArbitratedSteeringFeatureRequestActiveAuth Steering WheelHandsOffDetectionConfidenceLevelAuth	 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.
			Steering WheelHandsOffDetectionModeAuth	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				
			SWI P_Strg WhlAngGradAuth	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: BrkPed1nitTirvlAchvd Auth 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_FsFA RPPSD_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 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 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 SRRLFODP_Brst5_Prtctd SRRLFODP_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 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 SRRRFODP_Brst2_Prtctd SRRRFODP_Brst3_Prtctd SRRRFODP_Brst4_Prtctd SRRRFODP_Brst5_Prtctd SRRRFODP_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 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_Brst3_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:		Vehicle Supply Voltage	9< V< 16	See Threshold Values	Safety Emissions Neutral Diagnostics - Special Type C
					ECU Operating Conditions:	Any Partial Network that the ECU participates in is active		
			PPPS2DAbsolutePositionErrorEstimate	>0.050 seconds				
			PPPSAbsoluteHeadingErrorEstimate	>0.050 seconds	U161100_Enable	= True		
			PrimaryPrecisePositioningSystemCalendarDay	>0.050 seconds	Exceptions: If the vehicle is in Transport Mode			
			PrimaryPrecisePositioningSystemCalendarYear	>0.050 seconds	OR			
			PrimaryPrecisePositioningSystemElevation	>0.050 seconds	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.			
			PrimaryPrecisePositioningSystemHeading	>0.050 seconds				
			PrimaryPrecisePositioningSystemLatitude	>0.050 seconds	OR			
			PrimaryPrecisePositioningSystemLocationUsable	>0.050 seconds	When a bus off condition (U007X) is Active			
			PrimaryPrecisePositioningSystemLongitude	>0.050 seconds				
			PrimaryPrecisePositioningSystemLowerGlobalTimeStamp	>0.050 seconds				
			PrimaryPrecisePositioningSystemMode	>0.050 seconds				
			PrimaryPrecisePositioningSystemSignalAcquisitionTime	>0.050 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			PrimaryPrecisePositioning SystemTimeofDay PrimaryPrecisePositioning SystemUpperGlobalTime 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 (SYSTEMPOWER MODE) $0C9 (ENGINE RUN 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 (SYSTEMPOWER MODE) $0C9 (ENGINE RUN 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 (SYSTEMPOWER MODE) $0C9 (ENGINE RUN 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 (SYSTEMPOWER MODE) $0C9 (ENGINE RUN 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 (SYSTEMPOWER MODE) $0C9 (ENGINE RUN 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 (SYSTEMPOWER MODE) $0C9 (ENGINE RUN 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 downstream consumer.	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 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 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. 2} Checked at ECU cower uo.	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 or over voltage condition event	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
		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

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Vehicle Identification Number	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	Safety Non-MIL Emission neutral Diagnostic
		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 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 downstream consumer.	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 downstream consumer.	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 downstream consumer.	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 downstream consumer.	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 downstream consumer.	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

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	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 voltage condition event	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
		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

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
	U3000	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 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
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. 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.
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 Counter	9V< voltage < 16V = True = Enabled = Inactive > 5 seconds = Run = 0	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 downstream consumer.	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 Counter	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: ERCKEYJN VALID 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 ERC_SEQUENCE_ERROR	= Fault detected For all ERC errors: = True	Vehicle Supply Voltage PNC_ActiveTxPDUEnable AND k_SecurityPeripheralPerformanceDiagnosticPowerModeTime 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 over voltage condition event	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 > 1,255V	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 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 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 OEMs (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 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 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 participates in is active	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 participates in is active	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 participates in is active	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 participates in is active	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 Ilum.
		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 participates in is active	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 participates in is active	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 participates in is active	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 participates in is active	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 participates in is active	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 participates in is active	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 participates in is active	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.
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 Ilium.
		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	

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

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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	
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 Counter	9V< voltage < 16V = True = Enabled = Inactive > 5 seconds = Run = 0	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 downstream consumer.	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 Counter	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 > 1,255V	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

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		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 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 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 OEMs (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 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 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 participates in is active	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 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 participates in is active	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 participates in is active	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 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 participates in is active	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 participates in is active	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 participates in is active	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 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 participates in is active	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 participates in is active	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 participates in is active	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.
		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 participates in is active	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 participates in is active	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.
Longitudinal Acceleration Sensor Performance	C0552	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	> 0.0800 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 = 1 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 % > 50.0 Nm > 0.0800 g > 2.0 KPH < 120.0 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 > 4.0 seconds out of region 1 sample time > 5.0 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	> 0.0000 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	> 0.0000 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	> 0.1700 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 = 1 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 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 4 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	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g < 0.70 % < 50.0 Nm < -0.1700 g > 2.0 KPH < 120.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time > 2.0 seconds out of region 4 sample time > 2.5 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Performance	C0552	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	> 0.0800 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 = 1 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 % > 50.0 Nm > 0.0800 g > 2.0 KPH < 120.0 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 > 4.0 seconds out of region 1 sample time > 5.0 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	> 0.0000 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	> 0.0000 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	> 0.1700 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 = 1 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 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 4 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	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g < 0.70 % < 50.0 Nm < -0.1700 g > 2.0 KPH < 120.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time > 2.0 seconds out of region 4 sample time > 2.5 seconds, 50 millisecond update rate	

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 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.
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	C0697	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	C0698	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	C0699	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.
Backup Transmission Range Command Message Counter Incorrect	C1201	The diagnostic monitor detects an Alive Rolling Count (ARC) error or a two's compliment Protection Value (PV) error in the LIN bus frame containing the Electronic Transmission Range Selector (ETRS) backup transmission range command signal data. The ARC sequences 0, 1, 2, 3 repeatedly. As each serial data frame is broadcast by the transmitting controller, the transmitting controller increments the ARC in this sequence manner. The receiving controller compares the most recent received ARC value to the previous value plus one. If the values are not equal, an ARC error has occurred. The PV is based on the two's compliment of the serial data frame critical data parameters in the transmit message frame, and is incorporated in the transmit message frame. If the TCM receives the serial data message frame, the	rolling count value received from ECM/ CHCM and expected TCM calculated value not equal	= TRUE	service mode $04 active battery voltage ETRS ECM/CHCM frame recieved	= FALSE > 11.00 volts = TRUE	alive rolling count errors > 8 out of 10 sample counts	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		TCM calculates the PV, again based on the critical data parameters, in the receive message frame. If the TCM calculated PV does not equal the PV incorporated in the receive data message frame, a PV error has occurred. If continuous ARC errors or PV errors occur, the DTC is set.						

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.
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 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	500 milliseconds	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 calibration: 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 200 milliseconds 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: **P0606 PFM.Enable f (Loop Time)** (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606 PFM 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 PFM Sequence Sample f(Loop Time) counts 50 ms/count in the TCM main processor	

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.
Internal Control Module Redundant Memory Performance , P060C = previous model years P16F3	P060C	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** +			when fail timer reaches 100, set DTC	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 for vehicle speed time) 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)	= 1 (1 to enable, 0 to disable) > 5.0 KPH = TRUE > 5.0 KPH = TRUE = TRUE = TRUE = FALSE = TRUE > 8.0 KPH > 2.50 seconds = 4 Filled Clutches > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 > 1.00 Transfer case range is 4WD Lo:		

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.			output shaft deceleration DTCs Not Fault Active DTCs Not Test Failed This Key On	< -401.4 RPM/sec Else < -148.7 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	< **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			when incorrect downshift 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.
			timer 6.25 ms update rate		command shift monitor enable calibration Service Fast Learn OR (Service Fast Learn AND Vehicle Speed for vehicle speed time) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On	= 1 (1 to enable, 0 to disable) = FALSE = TRUE > 8.0 KPH > 2.50 seconds = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B		
			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*	**= Illegal Drive Clutch Combinations** = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = **Illegal Reverse Clutch Combinations**			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**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			driver requested range 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	= Reverse = 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 monitor enable OR clutch connectivity monitor disable Service Fast Learn OR (Service Fast Learn AND Vehicle Speed for vehicle speed time) 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 = 0 (0 to enable, 1 to disable) = FALSE = TRUE > 8.0 KPH > 2.50 = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B >	6.25 ms update rate > **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.
					pressure	**Clutch Connectivity C1 On Threshold** OR > **Clutch Connectivity C2 On Threshold** OR > **Clutch Connectivity C3 On Threshold** OR > **Clutch Connectivity C4 On Threshold** OR > **Clutch Connectivity C5 On Threshold** OR > **Clutch Connectivity C6 On Threshold** OR > **Clutch Connectivity C7 On Threshold**		
					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	= 0.0 OR > -1.00 kPa		
			ratio monitor fault pending	= TRUE	If all conditions below are		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	= FORWARD = REVERSE	met, increment ratio monitor fault pending timer:		**Ratio Monitor Fail Increment Rate (Percent per Loop)**	
			Plus following criteria based on driver requested range:		vehicle speed OR vehicle speed (note: fault pending will remain latched if vehicle speed max thresholds are exceeded)	> 0.50 AND < 6.00 KPH <-0.50 AND >-6.00 KPH	when timer reaches 100, set fault pending	
			Drive:				Fail time based on driver requested range (once fault pending has matured):	
			driver requested range	= Drive				
			Incorrect drive enable calibration	= 1 (1 to enable, 0 to disable)	Monitor Armed	= TRUE		
			Incrorrect drive disable calibration	= 0 (0 to enable, 1 to disable)	Measured output speed direction	= REVERSE or FORWARD	**Incorrect Drive Fail Time**	
			Reverse:		Input speed default direction	= REVERSE or FORWARD	**Incorrect Reverse Fail Time**	
			driver requested range	= Reverse				
			Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)	Current driver requested range for range time	= previous driver requested range > **Incorrect Direction Range Change Delay Time**	**Incorrect Neutral Fail Time**	
			Incrorrect reverse disable calibration	= 0 (0 to enable, 1 to enable)			**Incorrect Park Fail Time** 6.25 ms update rate	
			Neutral:		based on PRNDL position:			
			driver requested range	= Neutral	driver requested range AND	= Reverse		
			Incorrect neural enable calibration	= 1 (1 to enable, 0 to disable)	transmission measured speed ratio AND	> 0.40		
			Incrorrect neutral disable calibration	= 0 (0 to enable, 1 to disable)	Loop-to-loop change in measured ratio AND	> -8.00		
			Park:		(Direction By Ratio	= FORWARD		
			driver requested range	= Park	OR Direction Bv Clutch Slip)	= a FORWARD Gear		

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)
					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
					Range Shift State
					OR
					if Attained Gear enable cal:
					THEN
					Attained Gear
					
					ALSO
					Engine Speed
					Ratio Monitor enable cal
					OR
					Ratio Monitor disable cal
					*****************************
					Direction By Ratio:
					
					(vehicle speed
					OR
					vehicle speed)
					
					WHEN:
					Measured output speed direction
					AND
						= Drive
						
						< -0.40
						
						< 8.00
						
						= REVERSE
						
						= REVERSE
						*****************************
						
						= 0 (1 to enable, 0 to disable)
						= Range Shift Complete
						
						= 0 (1 to enable, 0 to disable)
						
						# Neutral AND # Park
						
						> 400 RPM
						= 1 (1 to enable, 0 to disable)
						= 0 (0 to enable, 1 to disable)
						*****************************
						
						> 0.50 KPH
						
						< -0.50 KPH
						
						= reverse		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Absolute measured gear ratio THEN Direction by Ratio ELSE WHEN Measured output speed direction AND Absolute measured gear ratio THEN Direction by Ratio ****************************** Direction by Clutch Slip: C1 clutch slip valid C2 clutch slip valid C5 clutch slip valid C3C4 dual clutch slip valid C3C6 dual clutch slip valid C4C6 dual clutch slip valid Direction by Clutch Slip Enable cal (vehicle speed OR vehicle speed) for each clutch: current clutch slip clutch held combination matches a valid qear in:	> 4.80 AND < 4.92 = REVERSE = forward > 4.65 AND < 0.66 = FORWARD ****************************** = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = 1 (1 to enable, 0 to disable) > 0.50 KPH < -0.50 KPH **Ratio Monitor Slip < Threshold** (if slip condition met, clutch held = 1, else held = 0) **Ratio Monitor Clutch States**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					*****************************	*****************************		
					General enables:			
					Transmission Type	= RWD 10 Spd Automatic		
					Service Fast Learn OR (Service Fast Learn AND Vehicle Speed for vehicle speed time)	= FALSE = TRUE > 8.0 KPH > 2.50 seconds		
					High Side Driver 1 On High Side Driver 2 On	= TRUE = 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.
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 >= 500 milliseconds	6/12 counts or 2,000 milliseconds 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	diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active battery voltage run crank voltage warm up test enable TFT rationality diagnostic monitor enabled driver accelerator pdeal position engine torque engine speed vehicle speed engine coolant temperature engine coolant temperature raw transmission fluid temperature raw transmission fluid temperature P2818 fault active P2818 test fail this key on DTCs not fault active	= 1 Boolean >9.00 volts >9.00 volts = 1 Boolean = VeTFSR_b_TFT_RatlEnbl > 5.0 % > 50.0 Nm > 500.0 RPM > 10.0 KPH > -40.0 °C < 150.0 °C > -273.0 °C < 150.0 °C = FALSE = FALSE	transmission fluid temperature warm up time > **transmission fluid temperature warm up time** seconds battery voltage time > 0.100 seconds run crank voltage 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.
					TFT Warmup Pass P0711 test fail this key on	EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA = 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 battery voltage	= 1 Boolean >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 Ω	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	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 fail 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.
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 run crank voltage diagnostic monitor enable P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on high side driver 1 enable high side driver 2 enable service fast learn active run crank voltage last valid raw transmission input speed OR valid raw transmission input speed (before drop event) last valid raw transmission input speed updates every 25 milliseconds when stablity time complete as long as (delta raw transmission input speed AND raw transmission input speed) raw transmission output speed accelerator pedal position engine torque engine torque transmission hydraulic pressure available: engine speed	= FALSE >9.00 volts = 1 Boolean = FALSE = FALSE = FALSE = TRUE = TRUE = FALSE > 5.00 volts > 240.0 RPM > 240.0 RPM < 320.0 RPM > 200.0 RPM > 377.0 RPM > 5.0 % < 8,191.9 Nm > 30.0 Nm > 500.0 RPM	fail time > 1.500 seconds updated fail event count, fail event count > 5 counts, 25 millisecond update rate raw transmission input speed time > 2.000 seconds stability time > 0.100 seconds engine speed time >	Type A, 1 Trips

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.
						= FALSE		
					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)	= FALSE		
					TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled	= 0 Boolean		
					transmission hydraulic pressure available:	= 1 Boolean	engine speed time > **engine speed time for transmission hydraulic pressure available**	
					engine speed	> 500.0 RPM		
					DTCs not fault active	EngineTorqueEstInaccurate		

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 calibration	= 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	= 1.00 Boolean		
					AND			
					Transfer Case Range Valid	=TRUE		
					AND		Wheel Speed Rationality met = 0 s	
					Vehicle Speed Fault	= FALSE		
					AND			
					Tease state	!= Neutral		
					AND		counts down from 0.25 s	
					Wheel Speed Sensor Present	= TRUE		
					AND			
					Output Speed calculate from wheel speed}	>= 100.00 rpm		
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND			
					TISS	< 8,191.9 RPM		
					AND			
					TISS)	> 250.0 RPM		
					OR			
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND			
					TISS	< 8,191.9 RPM		
					AND			
					TISS)	> 3,500.0 RPM		
					P0716 test fail this key on	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 test fail this key on	= FALSE		
					PTO check:			
					PTO enable calibration is FALSE	# 1 Boolean		
					OR			

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)	= 1 Boolean = TRUE		
					run crank voltage	> 5.00 volts		
					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	= FALSE >9.00 volts > -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE	 run crank voltage time > 25 milliseconds	
					transmission hydraulic pressure available: engine speed	 > 500.0 RPM	engine speed time > **engine speed time for transmission hydraulic pressure available**	
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate		

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 PTO 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_Transitionall 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 stability time > 2.00 seconds	
					raw transmission input speed) OR	> 200.0 RPM		
					Wheel speed usage enabled for failing TOS drop diagnostic) OR	= TRUE		
					(TISS/TOSS has single power supplv 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 AND4WD 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: 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.
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	= 1 Boolean		
					OR			
					TCC stuck on enable)	= 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	# 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	> 750.0 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 > 25.00 Nm > 1.00 % < 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 or at zero RPM. 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	******************************	******************************	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	
					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			

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 pressure 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	> 1,000.0 RPM		
					OR			
					transmission input shaft speed)	> 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	= 1 (1 to enable, 0 to disable)		
					driver direction request AND	= FORWARD		
					Attained Gear)	= a FORWARD gear		
					OR			
					(enable reverse gear cal AND	= 0 (1 to enable, 0 to disable)		
					driver direction request AND	= REVERSE		
					Attained Gear)	= 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					**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	
		hydraulically on, while the solenoid is electrically functional. All clutch pressure			****************************** system-level enables:	******************************		
		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			use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage)	= 1 Boolean = 1 Boolean >9.00 volts	battery voltage time > 0.100 seconds	
		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			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	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 GF9 C1 CB123456, GR10 C1 CB123456R, or 8 Speed C1 CB1278R 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 ****************************** range shift state diagnostic clutch test transmission output shaft speed ((C1 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C1 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ****************************** # range shift complete = OFF GOING CLUTCH TEST > 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable) < 350.0 kPa	all delay times exhaust delay by shift type: 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:	

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 **C6 Torque-Based Pressure Clip** clip thresholds for all other shift tvoes:	**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** Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C2 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C3 Oncoming Post-Torque Phase Delay + wheel slip delay** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **C2 Clutch Clip Press CD Shifts** **C3 Clutch Clip Press CD Shifts** **C4 Clutch Clip Press CD Shifts** **C5 Clutch Clip Press CD Shifts** **C6 Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**	**C4 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C5 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C6 Oncoming Post-Torque Phase Delay + wheel slip delay**	
					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 AND shift type enable cal for garage shift	= 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.
					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	 = 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			

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 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 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 or at zero RPM. 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	
					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			

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 pressure 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 GF9 C2 CB29, GR10C2 CB128910R, or 8 Speed C2 CB12345R 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		
					*****************************	*****************************		
					range shift state	# range shift complete	all delay times	
					diagnostic clutch test	= OFF GOING CLUTCH TEST	exhaust delay by shift type:	
					transmission output shaft speed	> 36.0 RPM	closed throttle upshift: **C2 exhaust delay open throttle power on up shift**	
					((C2 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)	open throttle upshift: **C2 exhaust delay open throttle power on up shift**	
					OR			
					C2 off going clutch command pressure)	< 350 kPa	garage shifts:	

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 Clip** clip thresholds for all other shift types: 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** Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C3 Oncoming Post-Torque Phase Delay + wheel slip delay** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Clutch Clip Press GS Shifts closed throttle downshift: **C1 Clutch Clip Press CD Shifts** **C3 Clutch Clip Press CD Shifts** **C4 Clutch Clip Press CD Shifts** **C5 Clutch Clip Press CD Shifts** **C6 Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**	**C4 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C5 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C6 Oncoming Post-Torque Phase Delay + wheel slip delay**	
					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)	# 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	= NEUTRAL OR commanded gear		
					AND			
					(stuck on enable cal for forward garge shifts	= 1 (0 to disable, 1 to enable)		
					AND			
					driver requested direction	= FORWARD		
					AND			
					commanded gear)	= a FORWARD gear		
					OR			
					(stuck on enable cal for reverse garage shifts	= 1 (0 to disable, 1 to enable)		
					AND			
					driver requested direction	= REVERSE		
					AND			
					commanded gear))	= REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has been initalized	= TRUE		
					OR			
					transitioning to a different clutch controller)	= TRUE		
					current clutch solenoid test state	transitions to TestState or TUT_HOLD (see note below about state transitions)		
					******************************	*****************************		
					DTCs not fault pending	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 or at zero RPM. 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) 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	****************************** = 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 pressure 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 millliscond 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 GF9 C3 CB38, GR10C3 C23457910, or 8 Speed C3C13567 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 ****************************** range shift state diagnostic clutch test transmission output shaft speed ((C3 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C3 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ****************************** # range shift complete = OFF GOING CLUTCH TEST > 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable) < 350 kPa	all delay times exhaust delay by shift type: 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:	

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 **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types: 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** Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C2 Oncoming Post-Torque Phase Delay + wheel slip delay** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Clutch Clip Press GS Shifts closed throttle downshift: **C1 Clutch Clip Press CD Shifts** **C2 Clutch Clip Press CD Shifts** **C4 Clutch Clip Press CD Shifts** **C5 Clutch Clip Press CD Shifts** **C6 Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**	**C4 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C5 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C6 Oncoming Post-Torque Phase Delay + wheel slip delay**	
					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 type enable cal for garage shift	= 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.
					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	= 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			

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 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 D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR 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	= FALSE		
					P0826 test fail this key on	= FALSE		
					P0826 fault pending	= FALSE		
					(P0815 fault active OR	= FALSE		
					P0815 fault active test fail this key on)	= FALSE		
					PRNDL range change time	> 1.00 seconds		
					PRNDL in range:			
					D1 OR	= 1 Boolean		
					D2OR	= 1 Boolean		
					D3OR	= 1 Boolean		
					D4OR	= 1 Boolean		
					D5OR	= 1 Boolean		
					D6OR	= 1 Boolean		
					D7OR	= 1 Boolean		
					D8OR	= 1 Boolean		
					D9OR	= 1 Boolean		
					D10OR	= 1 Boolean		
					NEUTRAL OR	= 0 Boolean		
					PARK OR	= 0 Boolean		
					REVERSE	= 0 Boolean		
					DTCs not fault pending	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 D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR 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 D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR 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 Ω 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	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 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 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 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	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 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, orCVT 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	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 C Control Circuit High	P0971	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, orCVT 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	 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.
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 >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.
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** # **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** **# 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.
					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	**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		
			(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	> 500.0 RPM > **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	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 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 Illum.
		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 > 6.00 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 P0717 fault pending or P172B or P172A or 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 or P160E 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		IF			
			MIL active due to		EngineTorqueEstInaccura	= TRUE		
			transmission default gear		te			
					AcceleratorPedalFailure	= TRUE		
					OR			
					CrankSensor_FA	= TRUE		
					OR			
					P2534 fault active	= TRUE		
					OR			
					(P0707 test fail this key	= TRUE		
					on OR			
					P0707 fault active OR	= TRUE		
					P0708 test fail this key on	= TRUE		
					OR			
					P0708 fault active OR	= TRUE		
					P2805 fault active OR	= TRUE		
					P27EE fault active OR	= TRUE		
					P27EB fault active OR	= TRUE		
					P27ED fault active OR	= TRUE		
					P17F7 fault active OR	= TRUE		
					P17F5 fault active OR	= TRUE		
					P17F6 fault active OR	= TRUE		
					P17FC fault active OR	= TRUE		
					P17FA fault active OR	= TRUE		
					P17FB fault active)	= TRUE		
					OR			
					(P0716 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR			
					P0717 fault pending, fault	= TRUE		
					active, test fail this key on	= TRUE		
					OR	= TRUE		
					P0721 fault pending, fault			
					active, test fail this key on	= TRUE		
					OR			
					P0722 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR	= TRUE		
					P0723 fault pending, fault	= TRUE		
					active, test fail this key on			
					OR	= TRUE		
					P077B fault oendinq, 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	= TRUE		
					P077C fault pending, fault active, test fail this key on OR	= TRUE		
					P077D fault pending, fault active, test fail this key on OR	= TRUE = TRUE		
					P07BF fault pending, fault active, test fail this key on OR	= TRUE		
					P07C0 fault pending, fault active, test fail this key on OR	= TRUE		
					P172A fault pending, fault active, test fail this key on OR	= TRUE		
					P172B fault pending, fault active, test fail this key on OR	= TRUE		
					P176B fault pending, fault active, test fail this key on OR	= TRUE		
					P176C fault pending, fault active, test fail this key on OR	= TRUE		
					P176D fault pending, fault active, test fail this key on OR	= TRUE		
					P1783 fault pending, fault active, test fail this key on OR	= TRUE		
					P178F fault pending, fault active, test fail this key on OR	= TRUE		
					P17C4 fault pending, fault active, test fail this key on OR	= TRUE		
					P17C5 fault pending, fault active, test fail this key on OR	= TRUE		
					P17C6 fault pending, 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	= TRUE		
					P17CC fault pending, fault active, test fail this key on OR	= TRUE		
					P17CD fault pending, fault active, test fail this key on OR	= TRUE		
					P17CE fault pending, fault active, test fail this key on OR	= TRUE		
					P17D3 fault pending, fault active, test fail this key on OR	= TRUE		
					P17D6 fault pending, fault active, test fail this key on)	= TRUE		
					SET tie-up test disable fault occur = 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_DualSpdSnsr **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	# 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 Uliyillz speed lillCz	**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 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	**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) 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	**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** # 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** **/ forward**	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 calibration (senor type 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	**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 calibration (senor type 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_Dual SpdSnsr = **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		
					*****************************	******************************		
					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 < 1.504 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	> 2.538 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	> 1.263 volts < 1.504 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	> 2.538 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 (P18AA OR 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 (P18AA OR 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 (T93GR10 Only)	P18A2	Controller specific circuit diagnoses internal ETRS park solenoid for an ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Controller specific circuit voltage thresholds are set to meet the following controller specification for an short to ground circuit Increment fail time	< 0.5 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 (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 (P18AA OR 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 02 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.
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 or at zero RPM. 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			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	
					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			

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 pressure 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			******************************	******************************	**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 GF9 C4 C4, GR10C4 C23467810R, or 8 Speed C4 C23468 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 ***************************** range shift state diagnostic clutch test transmission output shaft speed ((C4 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C4 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ***************************** # range shift complete = OFF GOING CLUTCH TEST > 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable) < 350 kPa	all delay times exhaust delay by shift type: 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:	

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** OR **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types:	**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** Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C2 Oncoming Post-Torque Phase Delay + wheel slip delay** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						garage shifts: **Clutch Clip Press GS Shifts** closed throttle downshift: **C1 Clutch Clip Press CD Shifts** **C2 Clutch Clip Press CD Shifts** **C3 Clutch Clip Press CD Shifts** **C5 Clutch Clip Press CD Shifts** **C6 Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**	**C3 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C5 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C6 Oncoming Post-Torque Phase Delay + wheel slip delay**	
					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)	# 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	= 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.**
					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	= 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			

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 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 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	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 D Control Circuit High	P2721	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, orCVT 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	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 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 or at zero RPM. 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	******************************	******************************	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	= 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	
					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			

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 pressure 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 pedal 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	> 1,000.0 RPM		
					OR			
					transmission input shaft speed)	> 350.0 RPM		
					C5 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					05 clutch pressured map	= mapped to line pressure, C5 clutch pressure has reached fully applied state		
					(enable forward gear cal	= 1 (1 to enable, 0 to disable)		
					AND			
					driver direction request	= FORWARD		
					AND			
					Attained Gear)	= a FORWARD gear		
					OR			
					(enable reverse gear cal	= 0 (1 to enable, 0 to disable)		
					AND			
					driver direction request	= REVERSE		
					AND			
					Attained Gear)	= 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 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	battery voltage time > 0.100 seconds	
					use run crank voltage	= 1 Boolean		
					calibration is FALSE			
					OR			
					(use run crank voltage	= 1 Boolean		
					calibration is TRUE			
					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 GF9 C5 C57R, GR10C5 C1356789, or 8 Speed C5 C45678R 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 ***************************** range shift state diagnostic clutch test transmission output shaft speed ((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C5 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ***************************** # range shift complete = OFF GOING CLUTCH TEST > 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable) < 350 kPa	all time delays exhaust delay by shift type: 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:	

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 **C6 Torque-Based Pressure Clip** clip thresholds for all other shift types: 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** Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C2 Oncoming Post-Torque Phase Delay + wheel slip delay** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Clutch Clip Press GS Shifts closed throttle downshift: **C1 Clutch Clip Press CD Shifts** **C2 Clutch Clip Press CD Shifts** **C3 Clutch Clip Press CD Shifts** **C4 Clutch Clip Press CD Shifts** **C6 Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**	**C3 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C4 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C6 Oncoming Post-Torque Phase Delay + wheel slip delay**	
					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	# Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					(Intrusive shift active AND shift type enable cal for garage shift)	= 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.
					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	 = 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			

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 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 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	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 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	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 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 or at zero RPM. 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	*****************************	*****************************	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	
					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			

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 pressure 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 (GF9 and 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	common logic between P2731 and P2733 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 P2733 specific attained gear update fail time 6.25 milliscond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM # 1st lock AND # 1st free wheel			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 GF9 C6 C6789 or GR10 C6 C4567891OR 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 ***************************** range shift state diagnostic clutch test transmission output shaft speed ((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C6 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ***************************** # range shift complete = OFF GOING CLUTCH TEST > 36.0 RPM = TRUE = 1 (1 to enable, 0 to disable) < 350 kPa	all time delays exhaust delay by shift type: 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:	

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 **C5 Torque-Based Pressure Clip** clip thresholds for all other shift types: 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** Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C2 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C3 Oncoming Post-Torque Phase Delay +**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Clutch Clip Press GS Shifts closed throttle downshift: **C1 Clutch Clip Press CD Shifts** **C2 Clutch Clip Press CD Shifts** **C3 Clutch Clip Press CD Shifts** **C4 Clutch Clip Press CD Shifts** **C5 Clutch Clip Press CD Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**	**wheel slip delay** OR **C4 Oncoming Post-Torque Phase Delay + wheel slip delay** OR **C5 Oncoming Post-Torque Phase Delay + wheel slip delay**	
					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) 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	enable)		
					AND			
					Attained Gear	= NEUTRAL OR commanded gear		
					AND			
					(stuck on enable cal for forward garge shifts	= 1 (0 to disable, 1 to enable)		
					AND			
					driver requested direction	= FORWARD		
					AND			
					commanded gear)	= a FORWARD gear		
					OR			
					(stuck on enable cal for reverse garage shifts	= 1 (0 to disable, 1 to enable)		
					AND			
					driver requested direction	= REVERSE		
					AND			
					commanded gear))	= REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has been initalized	= TRUE		
					OR			
					transitioning to a different clutch controller)	= TRUE		
					current clutch solenoid test state	transitions to TestState or TUT_HOLD (see note below about state transitions)		
					******************************	*****************************		
					DTCs not fault pending	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 verify 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.
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 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_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	diagnosis enable cal PRNDL state defaulted Transmission shift lever position Propulsion system active Ignition voltage Ignition voltage Transmission fluid temp Transmission fluid temp	= 1 (1 to enable, 0 to disable) = False = Forward range A = True > 9.00 volts < 31.99 volts > 0.00 °C < 110.00 °C	> 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 propulsion system active for > 5.00 sec	Type B, 2 Trips

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 = 2.146 3rd gear ratio = 1.769 4th gear ratio = 1.520 5th gear ratio = 1.275 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	< 0.5 Q impedance between signal and controller ground	diagnostic report enable diagnostic monitor enable	= 1 Boolean = 1 Boolean	> 20 fail counts out of > 25 sample counts update rate 100 milliseconds	Type B, 2 Trips
			Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short		run crank voltage battery voltage battery voltage	>5.00 volts > 9.00 volts < 15.0 volts	> 25 milliseconds	
			update fail and sample count		(pump is fed by high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(pump is fed by high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(pump is fed by high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					pump is not fed by any HSD	= CeEHPR_e_HSD1 (CeTSCR_e_NoHSD will enable)		

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 or GR10 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 GR10C3 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	> 1.263 volts < 1.504 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	> 2.538 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	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 > 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 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.
							see supporting table	
					service fast learn active	= FALSE		
					battery voltage	>9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	>9.00 volts	run crank voltage time > 0.100 seconds	
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					accelerator pedal position	> 8.0 %		
					accelerator pedal position	< 99.0 %		
					range shift state	= range shift complete		
					transmission fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.0 °C		
					engine torque	> 50.0 Nm		
					engine torque	< 8,191.8 Nm		
					P2817 test fail this key on	= FALSE		
					(TOC control mode OR	= ON mode (controlled slip mode)		
					TCC control mode)	= LOCK		
					attained gear	> CeCGSR_e_CR_Second		
					attainded gear slip	> 75.00 RPM		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		
					DTCs not fault pending	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 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	< 35.0 RPM > 50.0 RPM > 50.0 RPM > 40.0 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 < 15.0 RPM > FIRST GEAR > -15.0 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 run crank voltage time > 0.100 seconds	
					PRNDL	# PARK		
					commanded gear	# PARK		
					PRNDL	# NEUTRAL		
					commanded gear	# NEUTRAL		
					TCC command mode	= OFF		
					(PTO active	= FALSE		
					OR			
					PTO disable calibration)	= 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	> 200.0 RPM		
					engine speed	< 1,000.0 RPM		
					accelerator pedal position	< 5.0 %		
					4WD low state	= FALSE		
					(driver shift mode active	= FALSE		
					OR			
					driver shift mode calibration)	= 0 (0 to enable, 1 to disable)		
					clucth control solenoid			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	= 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 rate of change of engine speed] update TCC stuck on stall	# garage shift < 30.0 RPM > 70.0 Nm > 200.0 RPM < -2,000 RPM/second			TCC stuck on stall pending time > **P2818TCC stuck on fail time stall pending - GR10** when: fail count > 4 counts set DTC fault active 25 millisecond	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			pending time				update rate	
					MIN(commanded or attained gear turbine speed)	< desired engine speed - 50.0 RPM		
					active clutch control	# garage shift		
					freewheel-to-lock shift	= FALSE		
					lock-to-freewheel shift	= FALSE		
					(commanded gear AND output speed) OR (commanded gear AND output speed)	= REVERSE < -999,999.0 RPM > FIRST GEAR > 0.0 RPM		
					primary oncoming clutch command	> Return spring - **P2818 GR10 Oncoming Clutch Capacity Offset**		
					(TCC stuck off enable OR TCC stuck on enable)	= 1 Boolean = 1 Boolean		
					battery voltage	>9.00 volts		
					run crank voltage	>9.00 volts	battery voltage time > 0.100 seconds	
					diagnostic monitor enable	= 1 Boolean	run crank voltage time > 0.100 seconds	
					PRNDL	# PARK		
					commanded gear	# PARK		
					PRNDL	# NEUTRAL		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	> 200.0 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)		
					clucth control solenoid stuck ON AND stuck OFF intrusive shift active	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					TCC solenoid pulse request	= FALSE		
					vehicle speed	< 15.0 KPH		
					minimum turbine speed	< set point engine speed - 50.0 RPM		
					DTCs not fault pending	P281B, P281D, P281E, P0722, P0723, P0716, P0717, P07BF, P07C0, P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821		
					DTCs not fault active	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 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 > 0.30 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	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 > 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 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) 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	****************************** = 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 request	= 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) 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	****************************** = 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 neutral test to set DTC on next shift into drive:	> **P2820 GR10 hydraulic default input speed deceleration threshold**			decel time: > 0.05 sec decel observed within **P2820GR10 hydraulic default at launch test window**	

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		
					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	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					available (hydraulic pressure OR Clutch Stuck on in Park/ Neutral fault pending OR Neutral Staging Line Pressure Disable) ***************************** conditions needed to trigger decel test: Driver direction change request Driver requested direction default disable stuck off at launch enable cal ETRS system type deceleration test on previous shift into drive failed P2820 Test Passed this Key on OR (Multiple pass cal AND Trans output speed since last pass) Accelerator pedal position transmission input speed transmission output speed ***************************** conditions needed through duration of decel	 > 10.00 kPa = TRUE = TRUE ***************************** = TRUE = FORWARD = 0(1 to enable, 0 to disable) = CeTRGR_e_InternalETRS (CeTRGR_e_NoETRS to enable) = TRUE = FALSE = 0(1 to enable, 0 to disable) > 36.0 RPM < 2.5 % < 900 RPM < 100 RPM *****************************	> 0.10 sec	

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 hydraulically at engine start while the default disable solenoid has not failed electrically. The default disable solenoid feeds both the default disable valve but also feeds the ETRS hydraulic-mechanical (check-ball) valve. If the default disable solenoid is stuck on hydraulically, with the default disable solenoid providing a hydraulic pressure circuit to the ETRS hydraulic-mechanical (check-ball) valve at low transmission line pressure, the mode valve position sensor will indicate movement of the ETRS hydraulic-mechanical (check-ball) valve when it should not move during the engine start.	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	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 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 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	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.
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 / 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.
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	>=5.00 counts in a sliding window of 50 samples	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: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled	> 15,000.00 milliseconds >11.00 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	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.
					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 Power Steering Control Module	U0131	This DTC monitors for a loss of communication with the 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	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If OBDII: 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 > 15,000.00 milliseconds > 11.00 Volts >=8.00 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 the 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 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 OBDII: 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 > 15,000.00 milliseconds > 11.00 Volts >=8.00 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 the Restraints Control Module.	Message is not received from controller for Message $024: Message $0D1: Message $0D2: Message $441:	 >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	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If OBDII: 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 > 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts Disabled >=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/PCM.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), 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 (CSLIM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			SD19P_ARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			SrlDat19_Prtctd:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			SD18P_ARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			SrlDat18_Prtctd:	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			SD20P_ARC:	8.00 fail counts out of 18.00 sample counts				
			SrlDat20_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			SD71_ARC:	8.00 fail counts out of 18.00 sample counts				
			SD71_CS:	8.00 fail counts out of 18.00 sample counts				
			VSADP_ARC:	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.
				10.00 sample counts				
			VehSpdAvgDrvn_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			SD26P.ARC:	3.00 fail counts out of 10.00 sample counts				
			SrlDat26_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			SD22P_ARC:	3.00 fail counts out of 10.00 sample counts				
			SrlDat22_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			EVMESS2_ARC:	3.00 fail counts out of 10.00 sample counts				
			WDP-ARC:	3.00 fail counts out of 10.00 sample counts				
			WhlDist_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			CHCG_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 Brake System Control Module	U0418	This DTC monitors for an error in communication with the Brake System Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), 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 (CSLIM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			SD16P_ARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			SrlDat16_Prtctd:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			RATVCP_ARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			RrAxTrqValCmd_Prtctd:	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			BSIS2P_ARC:	8.00 fail counts out of 18.00 sample counts				
			BrkSysInfoSts2_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			SWIP_ARC:	8.00 fail counts out of 18.00 sample counts				
			StrgWhlInfo_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			SD15P_ARC:	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.
				10.00 sample counts				
			SrlDat15_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			SD17P_ARC:	3.00 fail counts out of 10.00 sample counts				
			SrlDat17_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 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),Protection Value (PV), 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 (CSLIM) is available on the bus.		Executes in 12.5ms loop.	Emissions Neutral Diagnostics - Type C
			SWIP_ARC:	8.00 fail counts out of 18.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			StrgWhlInfo_Prtctd:	8.00 fail counts out of 18.00 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: 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 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),Protection Value (PV), 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 (CSLIM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			SPMP_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		
			SysPwrMode_Prtctd:	3.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
			PltfTrnsTUDSwStARC:	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: 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 the Gateway A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), 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 (CSLIM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			BSPMP_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		
			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: 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 Restraints Control Module	U0452	This DTC monitors for an error in communication with the Restraints Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) of the following signals received over serial data is incorrect for: SD47P_ARC: SrlDat47_Prtctd:	 4.00 fail counts out of 10.00 sample counts 4.00 fail counts out of 10.00 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: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms 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.
Lost Communication With Gateway A on CAN 2	U1608	This DTC monitors for a loss of communication with the Gateway A on CAN 2.	Message is not received from controller for Message $209: Message $20D: Message $427: Message $561: Message $562:	>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 If OBDII: 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 > 15,000.00 milliseconds > 11.00 Volts >=8.00 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 Brake System Control Module 1 on CAN Bus 2	U1610	This DTC monitors for a loss of communication with the Brake System Control Module 1 on CAN Bus 2.	Message is not received from controller for Message $012: Message $014: Message $015: Message $017: Message $018: Message $01A: Message $025: Message $081: Message $082: Message $210: Message $211: Message $219: Message $415:	>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	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 $4B2: Message $4B4: Message $4B5:	>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 OBDII: 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 > 15,000.00 milliseconds > 11.00 Volts >=8.00 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 Control Module on CAN Bus 2	U1611	This DTC monitors for a loss of communication with the Engine Control Module on CAN Bus 2.	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 >10,000.00 milliseconds >10,000.00 milliseconds >418.75 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds > 387.50 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 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.
			Message $227: Message $229: Message $22A: Message $254: Message $41D: Message $41F: Message $429: Message $42A: 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	If OBDII: 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 > 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds				

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_SecKeySlotFailLimit	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 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	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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	200	200	200	200	200
500	200	200	200	200	200
1,100	200	200	200	200	200
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 - 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 - 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 - 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 - 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 - 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 - 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 - 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	CeTS ER_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	CeTS ER_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	CeTS ER_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

XUnit: 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 - P0606 PFM Sequence Fail f(Loop Time)

Description: Fail threshold for PFM per operating loop.

Value Units: Fail threshold for PFM (count)
X Unit: Operating Loop (enum)

P0606 PFM Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	8	8	8	8

P0606 PFM Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_10msFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	8	8	8	8

P0606 PFM Sequence Fail f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	4	4	2	2

P0606 PFM Sequence Fail f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	2			

Initial Supporting table - P0606 PFM Sequence Sample f(Loop Time)

Description: Sample threshold for PFM per operating loop.

Value Units: Sample threshold for PFM (count)
X Unit: Operating Loop (enum)

P0606 PFM Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	10	10	10	10

P0606 PFM Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_10msFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	10	10	10	10

P0606 PFM Sequence Sample f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	5	5	3	3

P0606 PFM Sequence Sample f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	3			

Initial Supporting table - P0606 PFM Enable f(Loop Time)

Description: PFM Enable

Value Units: PFM enable flag (boolean)
X Unit: Operating Loop Time Sequence (enum)

P0606 PFM.Enable f(Loop Time) - Part 1

y/x	CePISR_e_2p5msFlow	CePISR_e_3p125msFlow	CePISR_e_5msFlow	CePISR_e_6p25msFlow
1	0	0	0	0

P0606 PFM.Enable f(Loop Time) - Part 2

y/x	CePISR_e_10msFlow	CePISR_e_12p5msFlow	CePISR_e_20msFlow	CePISR_e_25msFlow
1	0	0	0	0

P0606 PFM.Enable f(Loop Time) - Part 3

y/x	CePISR_e_40msFlow	CePISR_e_50msFlow	CePISR_e_80msFlow	CePISR_e_1OOmsFlow
1	0	0	0	0

P0606 PFM.Enable f(Loop Time) - Part 4

y/x	CePISR_e_250msFlow			
1	0			

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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	200	200	200	200	200
500	200	200	200	200	200
1,100	200	200	200	200	200
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 C1 On Threshold

Description: Pressure command above which C1 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C2 On Threshold

Description: Pressure command above which C2 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C3 On Threshold

Description: Pressure command above which C3 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C4 On Threshold

Description: Pressure command above which C4 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C5 On Threshold

Description: Pressure command above which C5 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C6 On Threshold

Description: Pressure command above which C6 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C7 On Threshold

Description: Pressure command above which SOWC will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	300	300	300	300	300

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	CeTS ER_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	CeTS ER_e_C6_Clutch
1	0	0	0	0	0	0

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	62	62	4,096	62	62	65	62
CeTRMR_e_C2_Clutch	52	52	52	4,096	52	52	53
CeTRMR_e_C3_Clutch	69	69	69	69	4,096	69	330
CeTRMR_e_C4_Clutch	117	117	117	117	117	4,096	117
CeTRMR_e_C5_Clutch	56	56	56	56	217	56	4,096
CeTRMR_e_C6_Clutch	31	31	31	31	31	54	31
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	62	4,096	4,096	4,096	4,096	4,096	62
CeTRMR_e_C2_Clutch	52	4,096	4,096	52	52	53	4,096
CeTRMR_e_C3_Clutch	69	4,096	69	4,096	69	330	4,096
CeTRMR_e_C4_Clutch	659	4,096	117	117	4,096	117	117
CeTRMR_e_C5_Clutch	56	4,096	56	217	56	4,096	217
CeTRMR_e_C6_Clutch	4,096	4,096	31	31	54	31	31
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	65	62	62	67	62	62	65
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	52	58	52	53
CeTRMR_e_C3_Clutch	69	609	69	4,096	4,096	4,096	330
CeTRMR_e_C4_Clutch	4,096	117	659	4,096	117	659	4,096
CeTRMR_e_C5_Clutch	56	4,096	56	217	4,096	347	4,096
CeTRMR_e_C6_Clutch	54	31	4,096	54	31	4,096	148
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	65	62	62	4,096	62	62	65
CeTRMR_e_C2_Clutch	52	52	52	52	4,096	52	52
CeTRMR_e_C3_Clutch	69	69	69	69	69	4,096	69
CeTRMR_e_C4_Clutch	4,096	117	117	117	117	117	4,096
CeTRMR_e_C5_Clutch	56	56	56	56	56	217	56
CeTRMR_e_C6_Clutch	4,096	31	31	31	31	31	54
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	62	62	4,096	4,096	62	65	62
CeTRMR_e_C2_Clutch	53	52	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	330	69	4,096	69	4,096	69	609

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	117	659	4,096	117	117	4,096	117
CeTRMR_e_C5_Clutch	4,096	56	4,096	56	217	56	4,096
CeTRMR_e_C6_Clutch	31	4,096	4,096	31	31	54	31
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	62	67	62	62	65	65	62
CeTRMR_e_C2_Clutch	4,096	52	58	52	53	52	52
CeTRMR_e_C3_Clutch	69	4,096	4,096	4,096	330	69	69
CeTRMR_e_C4_Clutch	659	4,096	117	659	4,096	4,096	117
CeTRMR_e_C5_Clutch	56	217	4,096	347	4,096	56	56
CeTRMR_e_C6_Clutch	4,096	54	31	4,096	148	4,096	31
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	80	52
CeTRMR_e_C3_Clutch	69	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	117	117	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	56	4,096	4,096	217	217	4,096	347
CeTRMR_e_C6_Clutch	4,096	31	31	54	54	148	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	102	65	62	67	
CeTRMR_e_C2_Clutch	58	53	152	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	330	4,096	609	4,096	4,096	
CeTRMR_e_C4_Clutch	741	4,096	4,096	4,096	659	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	678	
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

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	168	168	4,096	168	168	176	168
CeTRMR_e_C2_Clutch	141	141	141	4,096	141	141	143
CeTRMR_e_C3_Clutch	186	186	186	186	4,096	186	891
CeTRMR_e_C4_Clutch	317	317	317	317	317	4,096	317
CeTRMR_e_C5_Clutch	151	151	151	151	586	151	4,096
CeTRMR_e_C6_Clutch	83	83	83	83	83	147	83
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	168	4,096	4,096	4,096	4,096	4,096	168
CeTRMR_e_C2_Clutch	141	4,096	4,096	141	141	143	4,096
CeTRMR_e_C3_Clutch	186	4,096	186	4,096	186	891	4,096
CeTRMR_e_C4_Clutch	1,779	4,096	317	317	4,096	317	317
CeTRMR_e_C5_Clutch	151	4,096	151	586	151	4,096	586
CeTRMR_e_C6_Clutch	4,096	4,096	83	83	147	83	83
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	176	168	168	181	168	168	176
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	141	156	141	143
CeTRMR_e_C3_Clutch	186	1,644	186	4,096	4,096	4,096	891
CeTRMR_e_C4_Clutch	4,096	317	1,779	4,096	317	1,779	4,096
CeTRMR_e_C5_Clutch	151	4,096	151	586	4,096	937	4,096
CeTRMR_e_C6_Clutch	147	83	4,096	147	83	4,096	399
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	176	168	168	4,096	168	168	176
CeTRMR_e_C2_Clutch	141	141	141	141	4,096	141	141
CeTRMR_e_C3_Clutch	186	186	186	186	186	4,096	186
CeTRMR_e_C4_Clutch	4,096	317	317	317	317	317	4,096
CeTRMR_e_C5_Clutch	151	151	151	151	151	586	151
CeTRMR_e_C6_Clutch	4,096	83	83	83	83	83	147
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	168	168	4,096	4,096	168	176	168
CeTRMR_e_C2_Clutch	143	141	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	891	186	4,096	186	4,096	186	1,644

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	317	1,779	4,096	317	317	4,096	317
CeTRMR_e_C5_Clutch	4,096	151	4,096	151	586	151	4,096
CeTRMR_e_C6_Clutch	83	4,096	4,096	83	83	147	83
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	168	181	168	168	176	176	168
CeTRMR_e_C2_Clutch	4,096	141	156	141	143	141	141
CeTRMR_e_C3_Clutch	186	4,096	4,096	4,096	891	186	186
CeTRMR_e_C4_Clutch	1,779	4,096	317	1,779	4,096	4,096	317
CeTRMR_e_C5_Clutch	151	586	4,096	937	4,096	151	151
CeTRMR_e_C6_Clutch	4,096	147	83	4,096	399	4,096	83
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	217	141
CeTRMR_e_C3_Clutch	186	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	317	317	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	151	4,096	4,096	586	586	4,096	937
CeTRMR_e_C6_Clutch	4,096	83	83	147	147	399	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	274	176	168	181	
CeTRMR_e_C2_Clutch	156	143	411	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	891	4,096	1,644	4,096	4,096	
CeTRMR_e_C4_Clutch	2,000	4,096	4,096	4,096	1,779	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,831	
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.I Ac	CeTRMR.e.IllegalPN.I Ad	CeTRMR.e.IllegalPN.I Af
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.I M	CeTRMR.e.IllegalPN.I Me	CeTRMR.e.IllegalPN.I Md	CeTRMR.e.IllegalPN.I Mf	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.CI .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.I 0	
CeTRMR.e.CI .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_C1Clutch	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_C1Clutch	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_C1Clutch	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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	CeTS ER_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 Supporting table - Ratio Monitor Clutch States

CeTSER_e_C6_Clutch	F	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	57	21
CeTGRR_e_Gear2	90	33
CeTGRR_e_Gear3	125	46
CeTGRR_e_Gear4	152	56
CeTGRR_e_Gear5	177	65
CeTGRR_e_Gear6	211	78
CeTGRR_e_Gear7	268	99
CeTGRR_e_Gear8	314	116
CeTGRR_e_Gear9	389	144
CeTGRR_e_Gear10	422	156

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 - C1 Clutch Clip Press CD Shifts

Description: C1 oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: clutch torque Nm
Y Units: unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	400.0	400.0	400.0	400.0	400.0

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 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 Units: unitless

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

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 - C2 Clutch Clip Press CD Shifts

Description: C2 oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: clutch torque Nm
Y Units: unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	400.0	400.0	400.0	400.0	400.0

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 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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

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 - C3 Clutch Clip Press CD Shifts

Description: C3 oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: clutch torque Nm
Y Units: unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	400.0	400.0	400.0	400.0	400.0

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 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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

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 - C4 Clutch Clip Press CD Shifts

Description: C4 oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: clutch torque Nm
Y Units: unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	400.0	400.0	400.0	400.0	400.0

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 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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

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 - C5 Clutch Clip Press CD Shifts

Description: C5 oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: clutch torque Nm
Y Units: unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	400.0	400.0	400.0	400.0	400.0

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 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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

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 - C6 Clutch Clip Press CD Shifts

Description: C6 oncoming clutch clip pressure for closed throttle down shifts

Value Units: kPa
X Unit: clutch torque Nm
Y Units: unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	400.0	400.0	400.0	400.0	400.0

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 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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

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 - 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	CeTS ER_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	CeTS ER_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	CeTS ER_e_C6_Clutch
1	450	500	600	750	750	500

Initial Supporting table - Clutch Connectivity C1 On Threshold

Description: Pressure command above which C1 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C1 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C2 On Threshold

Description: Pressure command above which C2 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C2 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C3 On Threshold

Description: Pressure command above which C3 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C3 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C4 On Threshold

Description: Pressure command above which C4 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C4 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C5 On Threshold

Description: Pressure command above which C5 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C5 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C6 On Threshold

Description: Pressure command above which C6 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C6 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C7 On Threshold

Description: Pressure command above which C7 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C7 clutch

y/x	-40	-20	0	20	120
1	300	300	300	300	300

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	CeTS ER_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	CeTS ER_e_C6_Clutch
1	0	0	0	0	0	0

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

XUnit: 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 - 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	62	62	4,096	62	62	65	62
CeTRMR_e_C2_Clutch	52	52	52	4,096	52	52	53
CeTRMR_e_C3_Clutch	69	69	69	69	4,096	69	330
CeTRMR_e_C4_Clutch	117	117	117	117	117	4,096	117
CeTRMR_e_C5_Clutch	56	56	56	56	217	56	4,096
CeTRMR_e_C6_Clutch	31	31	31	31	31	54	31
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	62	4,096	4,096	4,096	4,096	4,096	62
CeTRMR_e_C2_Clutch	52	4,096	4,096	52	52	53	4,096
CeTRMR_e_C3_Clutch	69	4,096	69	4,096	69	330	4,096
CeTRMR_e_C4_Clutch	659	4,096	117	117	4,096	117	117
CeTRMR_e_C5_Clutch	56	4,096	56	217	56	4,096	217
CeTRMR_e_C6_Clutch	4,096	4,096	31	31	54	31	31
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	65	62	62	67	62	62	65
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	52	58	52	53
CeTRMR_e_C3_Clutch	69	609	69	4,096	4,096	4,096	330
CeTRMR_e_C4_Clutch	4,096	117	659	4,096	117	659	4,096
CeTRMR_e_C5_Clutch	56	4,096	56	217	4,096	347	4,096
CeTRMR_e_C6_Clutch	54	31	4,096	54	31	4,096	148
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	65	62	62	4,096	62	62	65
CeTRMR_e_C2_Clutch	52	52	52	52	4,096	52	52
CeTRMR_e_C3_Clutch	69	69	69	69	69	4,096	69
CeTRMR_e_C4_Clutch	4,096	117	117	117	117	117	4,096
CeTRMR_e_C5_Clutch	56	56	56	56	56	217	56
CeTRMR_e_C6_Clutch	4,096	31	31	31	31	31	54
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	62	62	4,096	4,096	62	65	62
CeTRMR_e_C2_Clutch	53	52	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	330	69	4,096	69	4,096	69	609

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	117	659	4,096	117	117	4,096	117
CeTRMR_e_C5_Clutch	4,096	56	4,096	56	217	56	4,096
CeTRMR_e_C6_Clutch	31	4,096	4,096	31	31	54	31
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	62	67	62	62	65	65	62
CeTRMR_e_C2_Clutch	4,096	52	58	52	53	52	52
CeTRMR_e_C3_Clutch	69	4,096	4,096	4,096	330	69	69
CeTRMR_e_C4_Clutch	659	4,096	117	659	4,096	4,096	117
CeTRMR_e_C5_Clutch	56	217	4,096	347	4,096	56	56
CeTRMR_e_C6_Clutch	4,096	54	31	4,096	148	4,096	31
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	80	52
CeTRMR_e_C3_Clutch	69	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	117	117	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	56	4,096	4,096	217	217	4,096	347
CeTRMR_e_C6_Clutch	4,096	31	31	54	54	148	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	102	65	62	67	
CeTRMR_e_C2_Clutch	58	53	152	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	330	4,096	609	4,096	4,096	
CeTRMR_e_C4_Clutch	741	4,096	4,096	4,096	659	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	678	
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

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	168	168	4,096	168	168	176	168
CeTRMR_e_C2_Clutch	141	141	141	4,096	141	141	143
CeTRMR_e_C3_Clutch	186	186	186	186	4,096	186	891
CeTRMR_e_C4_Clutch	317	317	317	317	317	4,096	317
CeTRMR_e_C5_Clutch	151	151	151	151	586	151	4,096
CeTRMR_e_C6_Clutch	83	83	83	83	83	147	83
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	168	4,096	4,096	4,096	4,096	4,096	168
CeTRMR_e_C2_Clutch	141	4,096	4,096	141	141	143	4,096
CeTRMR_e_C3_Clutch	186	4,096	186	4,096	186	891	4,096
CeTRMR_e_C4_Clutch	1,779	4,096	317	317	4,096	317	317
CeTRMR_e_C5_Clutch	151	4,096	151	586	151	4,096	586
CeTRMR_e_C6_Clutch	4,096	4,096	83	83	147	83	83
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	176	168	168	181	168	168	176
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	141	156	141	143
CeTRMR_e_C3_Clutch	186	1,644	186	4,096	4,096	4,096	891
CeTRMR_e_C4_Clutch	4,096	317	1,779	4,096	317	1,779	4,096
CeTRMR_e_C5_Clutch	151	4,096	151	586	4,096	937	4,096
CeTRMR_e_C6_Clutch	147	83	4,096	147	83	4,096	399
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	176	168	168	4,096	168	168	176
CeTRMR_e_C2_Clutch	141	141	141	141	4,096	141	141
CeTRMR_e_C3_Clutch	186	186	186	186	186	4,096	186
CeTRMR_e_C4_Clutch	4,096	317	317	317	317	317	4,096
CeTRMR_e_C5_Clutch	151	151	151	151	151	586	151
CeTRMR_e_C6_Clutch	4,096	83	83	83	83	83	147
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	168	168	4,096	4,096	168	176	168
CeTRMR_e_C2_Clutch	143	141	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	891	186	4,096	186	4,096	186	1,644

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	317	1,779	4,096	317	317	4,096	317
CeTRMR_e_C5_Clutch	4,096	151	4,096	151	586	151	4,096
CeTRMR_e_C6_Clutch	83	4,096	4,096	83	83	147	83
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	168	181	168	168	176	176	168
CeTRMR_e_C2_Clutch	4,096	141	156	141	143	141	141
CeTRMR_e_C3_Clutch	186	4,096	4,096	4,096	891	186	186
CeTRMR_e_C4_Clutch	1,779	4,096	317	1,779	4,096	4,096	317
CeTRMR_e_C5_Clutch	151	586	4,096	937	4,096	151	151
CeTRMR_e_C6_Clutch	4,096	147	83	4,096	399	4,096	83
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	217	141
CeTRMR_e_C3_Clutch	186	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	317	317	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	151	4,096	4,096	586	586	4,096	937
CeTRMR_e_C6_Clutch	4,096	83	83	147	147	399	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	274	176	168	181	
CeTRMR_e_C2_Clutch	156	143	411	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	891	4,096	1,644	4,096	4,096	
CeTRMR_e_C4_Clutch	2,000	4,096	4,096	4,096	1,779	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,831	
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 - 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.I Ac	CeTRMR.e.IllegalPN.I Ad	CeTRMR.e.IllegalPN.I Af
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.I M	CeTRMR.e.IllegalPN.I Me	CeTRMR.e.IllegalPN.I Md	CeTRMR.e.IllegalPN.I Mf	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.Cl .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.I 0	
CeTRMR.e.Cl .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_C1Clutch	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_C1Clutch	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_C1Clutch	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 - 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 - 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 Supporting table - Ratio Monitor Clutch States

CeTSER_e_C6_Clutch	F	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	57	21
CeTGRR_e_Gear2	90	33
CeTGRR_e_Gear3	125	46
CeTGRR_e_Gear4	152	56
CeTGRR_e_Gear5	177	65
CeTGRR_e_Gear6	211	78
CeTGRR_e_Gear7	268	99
CeTGRR_e_Gear8	314	116
CeTGRR_e_Gear9	389	144
CeTGRR_e_Gear10	422	156

Initial Supporting table - wheel slip delay

Description:

y/x	1
1	-0.200

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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown

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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown

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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
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_Directionllnknown	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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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 - 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 - 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 - 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 - 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 - 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 - 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 - 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	CeTS ER_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	CeTS ER_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	CeTS ER_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

XUnit: 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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown

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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown

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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
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_Directionllnknown	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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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	200	200	200	200	200
500	200	200	200	200	200
1,100	200	200	200	200	200
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: °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 - 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 - 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	CeTS ER_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 - Clutch Connectivity C1 On Threshold

Description: Pressure command above which C1 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C2 On Threshold

Description: Pressure command above which C2 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C3 On Threshold

Description: Pressure command above which C3 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C4 On Threshold

Description: Pressure command above which C4 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C5 On Threshold

Description: Pressure command above which C5 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C6 On Threshold

Description: Pressure command above which C6 will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C7 On Threshold

Description: Pressure command above which SOWC will be considered commanded on

Value Units: Commanded Pressure (kPa)
X Unit: Transmission Oil Temperature (deg C)

y/x	-40	-20	0	20	120
1	300	300	300	300	300

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	CeTS ER_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	CeTS ER_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	168	168	4,096	168	168	176	168
CeTRMR_e_C2_Clutch	141	141	141	4,096	141	141	143
CeTRMR_e_C3_Clutch	186	186	186	186	4,096	186	891
CeTRMR_e_C4_Clutch	317	317	317	317	317	4,096	317
CeTRMR_e_C5_Clutch	151	151	151	151	586	151	4,096
CeTRMR_e_C6_Clutch	83	83	83	83	83	147	83
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	168	4,096	4,096	4,096	4,096	4,096	168
CeTRMR_e_C2_Clutch	141	4,096	4,096	141	141	143	4,096
CeTRMR_e_C3_Clutch	186	4,096	186	4,096	186	891	4,096
CeTRMR_e_C4_Clutch	1,779	4,096	317	317	4,096	317	317
CeTRMR_e_C5_Clutch	151	4,096	151	586	151	4,096	586
CeTRMR_e_C6_Clutch	4,096	4,096	83	83	147	83	83
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	176	168	168	181	168	168	176
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	141	156	141	143
CeTRMR_e_C3_Clutch	186	1,644	186	4,096	4,096	4,096	891
CeTRMR_e_C4_Clutch	4,096	317	1,779	4,096	317	1,779	4,096
CeTRMR_e_C5_Clutch	151	4,096	151	586	4,096	937	4,096
CeTRMR_e_C6_Clutch	147	83	4,096	147	83	4,096	399
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	176	168	168	4,096	168	168	176
CeTRMR_e_C2_Clutch	141	141	141	141	4,096	141	141
CeTRMR_e_C3_Clutch	186	186	186	186	186	4,096	186
CeTRMR_e_C4_Clutch	4,096	317	317	317	317	317	4,096
CeTRMR_e_C5_Clutch	151	151	151	151	151	586	151
CeTRMR_e_C6_Clutch	4,096	83	83	83	83	83	147
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	168	168	4,096	4,096	168	176	168
CeTRMR_e_C2_Clutch	143	141	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	891	186	4,096	186	4,096	186	1,644

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	317	1,779	4,096	317	317	4,096	317
CeTRMR_e_C5_Clutch	4,096	151	4,096	151	586	151	4,096
CeTRMR_e_C6_Clutch	83	4,096	4,096	83	83	147	83
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	168	181	168	168	176	176	168
CeTRMR_e_C2_Clutch	4,096	141	156	141	143	141	141
CeTRMR_e_C3_Clutch	186	4,096	4,096	4,096	891	186	186
CeTRMR_e_C4_Clutch	1,779	4,096	317	1,779	4,096	4,096	317
CeTRMR_e_C5_Clutch	151	586	4,096	937	4,096	151	151
CeTRMR_e_C6_Clutch	4,096	147	83	4,096	399	4,096	83
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	217	141
CeTRMR_e_C3_Clutch	186	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	317	317	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	151	4,096	4,096	586	586	4,096	937
CeTRMR_e_C6_Clutch	4,096	83	83	147	147	399	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	274	176	168	181	
CeTRMR_e_C2_Clutch	156	143	411	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	891	4,096	1,644	4,096	4,096	
CeTRMR_e_C4_Clutch	2,000	4,096	4,096	4,096	1,779	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	1,831	
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	62	62	4,096	62	62	65	62
CeTRMR_e_C2_Clutch	52	52	52	4,096	52	52	53
CeTRMR_e_C3_Clutch	69	69	69	69	4,096	69	330
CeTRMR_e_C4_Clutch	117	117	117	117	117	4,096	117
CeTRMR_e_C5_Clutch	56	56	56	56	217	56	4,096
CeTRMR_e_C6_Clutch	31	31	31	31	31	54	31
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	62	4,096	4,096	4,096	4,096	4,096	62
CeTRMR_e_C2_Clutch	52	4,096	4,096	52	52	53	4,096
CeTRMR_e_C3_Clutch	69	4,096	69	4,096	69	330	4,096
CeTRMR_e_C4_Clutch	659	4,096	117	117	4,096	117	117
CeTRMR_e_C5_Clutch	56	4,096	56	217	56	4,096	217
CeTRMR_e_C6_Clutch	4,096	4,096	31	31	54	31	31
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	65	62	62	67	62	62	65
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	52	58	52	53
CeTRMR_e_C3_Clutch	69	609	69	4,096	4,096	4,096	330
CeTRMR_e_C4_Clutch	4,096	117	659	4,096	117	659	4,096
CeTRMR_e_C5_Clutch	56	4,096	56	217	4,096	347	4,096
CeTRMR_e_C6_Clutch	54	31	4,096	54	31	4,096	148
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	65	62	62	4,096	62	62	65
CeTRMR_e_C2_Clutch	52	52	52	52	4,096	52	52
CeTRMR_e_C3_Clutch	69	69	69	69	69	4,096	69
CeTRMR_e_C4_Clutch	4,096	117	117	117	117	117	4,096
CeTRMR_e_C5_Clutch	56	56	56	56	56	217	56
CeTRMR_e_C6_Clutch	4,096	31	31	31	31	31	54
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	62	62	4,096	4,096	62	65	62
CeTRMR_e_C2_Clutch	53	52	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	330	69	4,096	69	4,096	69	609

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	117	659	4,096	117	117	4,096	117
CeTRMR_e_C5_Clutch	4,096	56	4,096	56	217	56	4,096
CeTRMR_e_C6_Clutch	31	4,096	4,096	31	31	54	31
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	62	67	62	62	65	65	62
CeTRMR_e_C2_Clutch	4,096	52	58	52	53	52	52
CeTRMR_e_C3_Clutch	69	4,096	4,096	4,096	330	69	69
CeTRMR_e_C4_Clutch	659	4,096	117	659	4,096	4,096	117
CeTRMR_e_C5_Clutch	56	217	4,096	347	4,096	56	56
CeTRMR_e_C6_Clutch	4,096	54	31	4,096	148	4,096	31
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	80	52
CeTRMR_e_C3_Clutch	69	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	117	117	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	56	4,096	4,096	217	217	4,096	347
CeTRMR_e_C6_Clutch	4,096	31	31	54	54	148	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	102	65	62	67	
CeTRMR_e_C2_Clutch	58	53	152	4,096	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	330	4,096	609	4,096	4,096	
CeTRMR_e_C4_Clutch	741	4,096	4,096	4,096	659	4,096	
CeTRMR_e_C5_Clutch	4,096	4,096	4,096	4,096	4,096	678	
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_OutLockl	CeTCLR_e_TUM_OutLock2	CeTCLR_e_TUM_OutLock3	CeTCLR_e_TUM_OutLock4	CeTCLR_e_TUM_OutLock5	CeTCLR_e_TUM_OutLock6	CeTCLR_e_TUM_OutLock7
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: 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.lllegalPN.I Ac	CeTRMR.e.lllegalPN.I Ad	CeTRMR.e.lllegalPN.I Af
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.lllegalPN.I M	CeTRMR.e.lllegalPN.I Me	CeTRMR.e.lllegalPN.I Md	CeTRMR.e.lllegalPN.I Mf	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.Cl .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.lllegalPN.I 0	
CeTRMR.e.Cl .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_C1Clutch	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_C1Clutch	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_C1Clutch	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 spe;ed 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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown

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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown

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_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown
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_Directionllnknown	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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	350	225	10

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 - 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 Supporting table - Ratio Monitor Clutch States

CeTSER_e_C6_Clutch	F	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	57	21
CeTGRR_e_Gear2	90	33
CeTGRR_e_Gear3	125	46
CeTGRR_e_Gear4	152	56
CeTGRR_e_Gear5	177	65
CeTGRR_e_Gear6	211	78
CeTGRR_e_Gear7	268	99
CeTGRR_e_Gear8	314	116
CeTGRR_e_Gear9	389	144
CeTGRR_e_Gear10	422	156

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 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
		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 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
		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 over voltage 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 General Keys is being nvnr'i ,ted	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_SerialDataAuthentificationPowerModeTime Fault Code U196192 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	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 is active	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 is active	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 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

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 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 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

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

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 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
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 General Keys is being nvnr'i itr'k/d	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 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 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 U1961 92 U196200_ENABLE Transport Mode Time since power up reset or running reset or under voltage or over voltage condition event	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

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

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