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 (Switch located on HVAC Faceplate)	B2A01	This diagnostic detects a voltage out of range high failure of Front Faceplate AC switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate AC Control Switch Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 (Switch located on HVAC Faceplate)	B2A02	This diagnostic detects a voltage out of range low failure of Front Faceplate AC control switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate AC Control Switch Voltage	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 (Switch located on HVAC Faceplate)	B2A04	This diagnostic detects a failure of the Front Faceplate AC switch in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Rear Defog Switch Voltage Front Faceplate Rear Defog Switch Voltage	<= 2.70 V >= 1.30 V	Diagnostic is enabled Front Faceplate AC Control Switch Sensed State is not Front Faceplate AC Control Switch Sensed State is not Front Faceplate AC Control Switch Sensed State is not The integrity of the CAN communication is good No DTCs:	= Out of Range High = Out of Range Low = Indeterminate B2A01, B2A02, B2A03, U0164, U0424	Conditions are met for a continuous time > 90.00 sec, followed by an additional 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 Air Distribution Discrete Control Front Left 1 Circuit High	B2A16	This diagnostic detects a voltage out of range high failure of the Front Faceplate Air Distribution Discrete Control Switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Temperature Level Front (1) Left Switch Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Air Distribution Discrete Control Front Left 1 Circuit Low	B2A17	This diagnostic detects a voltage out of range low failure of the Front Faceplate Temperature Discrete switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Temperature Level Front (1) Left Switch Voltage	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Air Distribution Discrete Control Front Left 1 Performance	B2A19	This diagnostic detects a failure of the Front Faceplate Air Distribution Discrete Control Switch in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	The Difference of Front Faceplate Request Temperature Front Left Raw Voltage High Side and Front Faceplate Request Temperature Front Left Raw Voltage Low Side is or	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	B2A16, B2A17, U0164, U0424	Conditions are met for a continuous time > 90.00 sec, followed by an additional 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 Air Distribution Discrete Control Front Left 2 Circuit High	B2A1A	This diagnostic detects a voltage out of range high failure of the Front Faceplate Air Distribution Discrete Control Switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Temperature Level Front (2) Left Switch Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Air Distribution Discrete Control Front Left 2 Circuit Low	B2A1B	This diagnostic detects a voltage out of range low failure of the Front Faceplate Air Distribution Discrete Control Switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Temperature Level Front (2) Left Switch Voltage	>= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	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 Air Distribution Discrete Control Front Left 2 Performance	B2A1D	This diagnostic detects a failure of the Front Faceplate Air Distribution Discrete Control Switch in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	The Difference of Front Faceplate Request Temperature Front Left Raw Voltage High Side and Front Faceplate Request Temperature Front Left Raw Voltage Low Side is or	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	B2A1A, B2A1B, U0164, U0424	Conditions are met for a continuous time >90.00 sec, followed by an additional 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 Air Distribution Discrete Control Front Left 3 Circuit High	B2A1E	This diagnostic detects a voltage out of range high failure of the Front Faceplate Air Distribution Discrete Control Switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Temperature Level Front (3) Left Switch Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Air Distribution Discrete Control Front Left 3 Circuit Low	B2A1F	This diagnostic detects a voltage out of range low failure of the Front Faceplate Temperature Discrete switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Temperature Level Front (3) Left Switch Voltage	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	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 Air Distribution Discrete Control Front Left 3 Performance	B2A21	This diagnostic detects a failure of the Front Faceplate Air Distribution Discrete Control Switch in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	The Difference of Front Faceplate Request Temperature Front Left Raw Voltage High Side and Front Faceplate Request Temperature Front Left Raw Voltage Low Side is or	 <= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 B2A1F, B2A21, U0164, U0424	Conditions are met for a continuous time >90.00 sec, followed by an additional 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 (Switch located on HVAC Faceplate)	B2A36	This diagnostic detects a voltage out of range high failure of the Front Faceplate Auto switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Front HVAC AUTO Switch Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	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 (Switch located on HVAC Faceplate)	B2A37	This diagnostic detects a voltage out of range low failure of the Front Faceplate Auto switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Front HVAC AUTO Switch Voltage	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 (Switch located on HVAC Faceplate)	B2A39	This diagnostic detects a failure of the Front Faceplate Auto switch in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Front HVAC AUTO Raw Voltage Front Faceplate Request Front HVAC AUTO Raw Voltage	>= 1.30 V <= 2.70 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	B2A36, B2A37, B2A38, U0164, U0424	Conditions are met for a continuous time >90.00 sec, followed by an additional 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 (Switch located on HVAC Faceplate)	B2A3E	This diagnostic detects a voltage out of range high failure of the Front Faceplate Blower Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Blower Level Front Switch Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 (Switch located on HVAC Faceplate)	B2A3F	This diagnostic detects a voltage out of range low failure of the Front Faceplate Blower Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Blower Level Front Switch Voltage	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 (Switch located on HVAC Faceplate)	B2A41	This diagnostic detects a failure of the Front Faceplate Blower Continuous Toggle in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Blower Switch Voltage Front Faceplate Request Blower Switch Voltage	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 B2A3E, B2A3F, U0164, U0424	Conditions are met for a continuous time > 90.00 sec, followed by an additional 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 (Switch located on HVAC Faceplate)	B2A42	This diagnostic detects a voltage out of range high failure of the Front Faceplate Blower Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Blower Level Front Switch Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 (Switch located on HVAC Faceplate)	B2A43	This diagnostic detects a voltage out of range low failure of the Front Faceplate Blower Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Blower Level Front Switch Voltage	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	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 (Switch located on HVAC Faceplate)	B2A45	This diagnostic detects a failure of the Front Faceplate Blower Continuous Toggle in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Blower Switch Voltage Front Faceplate Request Blower Switch Voltage	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	B2A42, B2A43, U0164, U0424	Conditions are met for a continuous time >90.00 sec, followed by an additional 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 (Switch located on HVAC Faceplate)	B2A67	This diagnostic detects a voltage out of range high failure of the Front Faceplate Max Defrost switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Front Max Defrost Switch Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	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 (Switch located on HVAC Faceplate)	B2A68	This diagnostic detects a voltage out of range low failure of the Front Faceplate Max Defrost switch. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Front Defrost Raw Voltage is	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	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 (Switch located on HVAC Faceplate)	B2A6A	This diagnostic detects a failure of the Front Faceplate Max Defrost switch in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Max Defrost Switch Voltage Front Faceplate Max Defrost Switch Voltage	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 B2A67, B2A68, U0164, U0424	Conditions are met for a continuous time >90.00 sec, followed by an additional 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 diagnostic detects a voltage out of range high failure of the Front Faceplate Power Switch. The sensor is hardwired to the diagnosing controller, which its voltage is being measured at.	Front Faceplate Request Front HVAC Power Switch Voltage	> 4.30 V	Diagnostic is enabled Controller has been awaken for a duration greater than (i.e. "Wakeup Pass" is True)	 >25.00 seconds	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Power Front Control Circuit Low	B2A6C	This diagnostic detects a voltage out of range low failure of the Front Faceplate Power Switch. The sensor is hardwired to the diagnosing controller, which its voltage is being measured at.	Front Faceplate Request Front HVAC Power Voltage	<1.40V	Diagnostic is enabled Controller has been awaken for a duration greater than (i.e. "Wakeup Pass" is True)	 >25.00 seconds	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Front Faceplate Power Front Control Performance	B2A6E	This diagnostic detects a failure of the Front Faceplate Power Switch in a continuously applied state. The sensor is hardwired to the diagnosing controller, which its voltage is being measured at.	Front Faceplate Power Switch Voltage Front Faceplate Power Switch Voltage	>= 1.30 V <= 2.70 V	Diagnostic is enabled No Active Circuit DTC's Controller has been awaken for a duration greater than (i.e. "Wakeup Pass" is True)	B2A6B, B2A6C >25.00 seconds	Conditions are met for a continuous time >90.00 sec, followed by an additional 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 (Switch located on HVAC Faceplate)	B2A87	This diagnostic detects a voltage out of range high failure of the Front Faceplate Temperature Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	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 Temperature Control Front 1 Left Circuit Low (Switch located on HVAC Faceplate)	B2A88	This diagnostic detects a voltage out of range low failure of the Front Faceplate Temperature Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Request Temperature Level Front (1) Left Raw Voltage is	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Temperature Control Front 1 Left Performance (Switch located on HVAC Faceplate)	B2A8A	This diagnostic detects a failure of the Front Faceplate Temperature Continuous Toggle in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage Front Faceplate Temperature Continuous Toggle Voltage	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	B2A87, B2A88, U0164, U0424	Conditions are met for a continuous time > 90.00 sec, followed by an additional 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 Temperature Control Front 2 Left Circuit High (Switch located on HVAC Faceplate)	B2A8B	This diagnostic detects a voltage out of range high failure of the Front Faceplate Temperature Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Temperature Control Front 2 Left Circuit Low (Switch located on HVAC Faceplate)	B2A8C	This diagnostic detects a voltage out of range low failure of the Front Faceplate Temperature Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	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 Temperature Control Front 2 Left Performance (Switch located on HVAC Faceplate)	B2A8E	This diagnostic detects a failure of the Front Faceplate Temperature Continuous Toggle in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage Front Faceplate Temperature Continuous Toggle Voltage	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	B2A8B, B2A8C, U0164, U0424	Conditions are met for a continuous time >90.00 sec, followed by an additional 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 Temperature Control Front 1 Right Circuit High (Switch located on HVAC Faceplate)	B2A93	This diagnostic detects a voltage out of range high failure of the Front Faceplate Temperature Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Temperature Control Front 1 Right Circuit Low (Switch located on HVAC Faceplate)	B2A94	This diagnostic detects a voltage out of range low failure of the Front Faceplate Temperature Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage	<= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Temperature Control Front 1 Right Performance (Switch located on HVAC Faceplate)	B2A96	This diagnostic detects a failure of the Front Faceplate Temperature Continuous Toggle in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage Front Faceplate Temperature Continuous Toggle Voltage	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	B2A93, B2A94, B2A95, U0164, U0424	Conditions are met for a continuous time >90.00 sec, followed by an additional 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 Temperature Control Front 2 Right Circuit High (Switch located on HVAC Faceplate)	B2A97	This diagnostic detects a voltage out of range high failure of the Front Faceplate Temperature Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage	>= 2.80 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Temperature Control Front 2 Right Circuit Low (Switch located on HVAC Faceplate)	B2A98	This diagnostic detects a voltage out of range low failure of the Front Faceplate Temperature Continuous Toggle. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage	= 0.60 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 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 Temperature Control Front 2 Right Performance (Switch located on HVAC Faceplate)	B2A9A	This diagnostic detects a failure of the Front Faceplate Temperature Continuous Toggle in a continuously applied state. The sensor voltage is measured by the smart device and is communicated to the diagnosing controller over CAN.	Front Faceplate Temperature Continuous Toggle Voltage Front Faceplate Temperature Continuous Toggle Voltage	<= 2.70 V >= 1.30 V	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	B2A97, B2A98, U0164, U0424	Conditions are met for a continuous time >90.00 sec, followed by an additional 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.
Blower Motor Speed Circuit High	B2B00	This diagnostic detects a short to battery fault on the blower motor output control circuit by monitoring circuit voltage while the blower is commanded on. When the diagnosing controller's board support package detects the fault it will communicate this through a fault status flag. When this fault is detected for 0.3 seconds, the board support package will command off the control output for 10 seconds before restarting.	Front blower power short fault status (as determined by the controller's board support package)	= Fail	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) Front blower power short fault status (as determined by the controller's board support package) Front blower commanded duty cycle	 > 25.00 seconds # Indeterminate > 0 %	0.15 seconds out of a 0.2 seconds window Note: This time is intended to mature the fault before the board support package shuts off the output control (protection mode) for 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.
Blower Motor Speed Circuit Low	B2B01	This diagnostic detects a short to ground or open circuit fault on the blower motor output control circuit by monitoring circuit voltage while the blower is commanded off. When the diagnosing controller's board support package detects the fault it will communicate this through a fault status flag.	Front blower ground short fault status (as determined by the controller's board support package) OR Front blower open short fault status (as determined by the controller's board support package)	= Fail = Fail	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) Front blower ground short fault status Front blower open fault status Front blower commanded duty cycle	> 25.00 seconds # Indeterminate # Indeterminate = 0 %	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.
Blower Motor Speed Return Circuit High	B2B02	This diagnostic detects a short to battery fault on the blower motor speed feedback circuit by monitoring circuit duty cycle while the blower is commanded on.	Front Blower Feedback Duty Cycle AND Front Blower Feedback Duty Cycle	>= 0.00 % <=10.00%	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) Front blower commanded duty cycle Commanded Front Blower Speed Duty Cycle has been greater than 10.00 % for a duration greater than	 > 25.00 seconds > 10.00% > 5.00 seconds	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Return Circuit Low	B2B03	This diagnostic detects a short to ground and open circuit fault on the blower motor speed feedback circuit by monitoring circuit duty cycle while the blower is commanded on.	Front Blower Feedback Duty Cycle AND Front Blower Feedback Duty Cycle	<=100.00% >= 90.00 %	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) Front blower commanded duty cycle	> 25.00 seconds > 10.00%	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.
Blower Motor Speed Return Feedback Circuit Out of Range High	B2B0B	This diagnostic detects an implausibly high measured blower motor feedback speed by monitoring circuit frequency while the blower is commanded on.	Front Blower Feedback Frequency	>250.00 Hz	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) Front blower commanded duty cycle No DTCs:	 > 25.00 seconds >10.00% B2B02, B2B03	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.
Blower Motor Speed Return Feedback Circuit Out of Range Low	B2B0C	This diagnostic detects an implausibly low measured blower motor feedback speed by monitoring circuit frequency while the blower is commanded on.	Front Blower Feedback Frequency	<45.00 Hz	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) Front blower commanded duty cycle Commanded Front Blower Speed Duty Cycle has been greater than 10.00 % for a duration greater than No DTCs:	 > 25.00 seconds >10.00% > 5.00 seconds B2B02, B2B03	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.
Blower Motor Speed Circuit Stuck On Diagnostic	B2BC2	This diagnostic detects a front blower speed feedback that is stuck to a high value when the blower is commanded off.	Front blower actual (feedback) speed is greater than	>= 50.0 rpm	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) Battery Voltage In Range Status Front blower is commanded with a duty cycle less than The front blower duty cycle command has been 0% for a duration greater than	 > 25.00 seconds = True <10.00% >10.00 seconds	8 seconds out of a 10 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Blower Motor Speed Circuit Overspeed	B2BC3	This diagnostic detects a blower speed that is too low with respect to the expected speed based on the blower command. Measured actual blower speed is monitored against a calibrated lower acceptable limit under normal operating conditions.	Filtered difference between the commanded front blower speed and the actual (feedback) front blower speed is Note: the filter uses a first-order lag with time constant 1.00 (where 1.0 means no filtering, and 0.0 means max filtering).	< -1,062.0 rpm	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) Battery Voltage In Range Status Front blower is commanded with a duty cycle greater than The front blower duty cycle command has been stable within 1.0% for a duration greater than HVAC System Mode has been in either Engine-On or Ignition-On state for a duration greater than: • OR outside air temperature is • OR front blower duty cycle command is No DTCs:	 > 25.00 seconds = True >10.00% > 10.00 seconds > 30.00 seconds <=30.00 °C <=50.00% B2B00, B2B01, B2B02, B2B03, B2B0B, B2B0C	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.
Blower Motor Speed Circuit Underspeed	B2BC4	This diagnostic detects a blower speed that is too high with respect to the expected speed based on the blower command. Measured actual blower speed is monitored against a calibrated upper acceptable limit under normal operating conditions.	Filtered difference between the commanded front blower speed and the actual (feedback) front blower speed is Note: the filter uses a first-order lag with time constant 1.00 (where 1.0 means no filtering, and 0.0 means max filtering).	> 1,062.0 rpm	Diagnostic is Enabled		8 seconds out of a 10 seconds window	Type B, 2 Trips
					Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True)	> 25.00 seconds		
					Battery Voltage In Range Status	= True		
					Front blower is commanded with a duty cycle greater than	>10.00%		
					The front blower duty cycle command has been stable within 1.0% for a duration greater than	> 10.00 seconds		
					HVAC System Mode has been in either Engine-On or Ignition-On state for a duration greater than:	> 30.00 seconds		
					• OR outside air temperature is	<=30.00 °C		
					• OR front blower duty cycle command is	<=50.00%		
					No DTCs:	B2B00, B2B01, B2B02, B2B03, B2B0B, B2B0C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Virtual Cockpit Unit Internal Electronic Failure	B2BCC	This diagnostic detects when Virtual Cockpit Unit (VCU) has internal electronic failure. The internal failure will be identified by VCU and is communicated to the diagnosing controller over CAN.	Virtual Cockpit Unit Internal Component Error The VCU will set this error flag to Fail when it detects internal controller related failures (e.g. RAM/ROM corruption) or graphics processing related failures.	= FAIL	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	 U164E, U0485	4 seconds out of a 5 seconds window	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.
Fully Integrated Display Module Internal Electronic Failure	B2BCD	This diagnostic detects when Fully Integrated Display Module (FIDM) has internal electronic failure. The internal failures will be identified by the FIDM smart device and is communicated to the Virtual Cockpit Unit (VCU), which packages the failure indications into a single flag that is communicated to the diagnosing controller over CAN.	Fully Integrated Display Module Internal Electronic Failure is The FIDM will set this error flag when it detects internal display or controller related failures (e.g. OLDI/eDP, Display, Gate/Source Driver, Watchdog or MCU software reset, Abnormal power-on reset, Power Management, LVDS link lock), backlight related failures (e.g. backlight driver/LED fault), or touch panel related failures (e.g. touch element circuit faults).	= FAIL	Diagnostic is enabled The integrity of the CAN communication is good. The integrity of the private I2C communication between the FIDM and VCU is good. No DTCs:	U223B, U164E, U13F9, U0485	4 seconds out of a 5 seconds window	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.
Air Conditioning (A/C) Evaporator Temperature Sensor Circuit	P0535	This diagnostic detects a intermittent short to ground or power, intermittent open circuit, or erratic signal on the Evaporator Air Temperature Sensor by monitoring sensor temperature and failing when the signal changes by a larger magnitude than expected across two measurements.	Evaporator Air Temperature changes across 2 consecutive samples by a magnitude (absolute value) greater than	> 4.00°C/sec	Diagnostic is Enabled 12 Volt System Voltage in Range Status Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True) No Active DTCs	 = TRUE = 25.00 sec 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.
Air Conditioning (A/C) Evaporator Temperature Sensor Circuit Low	P0537	This diagnostic detects a continuous short to ground on the Evaporator Air Temperature Sensor by monitoring sensor voltage (% of reference voltage) and failing when the voltage is too low.	Debouned Raw Evaporator Air Temperature Voltage is	< 0.17 (Volts)	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True)	= 25.00 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.**
Air Conditioning (A/C) Evaporator Temperature Sensor Circuit High	P0538	This diagnostic detects a continuous short to battery or open circuit on the Evaporator Air Temperature Sensor by monitoring sensor voltage (% of reference voltage) and failing when the voltage is too high.	Debouned Raw Evaporator Air Temperature Voltage is	> 4.75 (Volts)	Diagnostic is Enabled Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True)	 = 25.00 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.
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 = CbTRUE = U01B000 = U04B100	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 = CbTRUE = CbTRUE = U01B00 = U04B100 = 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**	= CbTRUE		
					IBS Current Performance Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		

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**	= CbTRUE		
					IBS Temperature Performance Continuous Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
					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**	= CbTRUE		
					IBS Temperature Performance Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
					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: System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable < 10.00)	8 seconds out of a 10 seconds window	Type B, 2 Trips
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Battery Monitor Module Voltage Performance Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
					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 = CbTRUE = CbTRUE = U01B000 = U04B100	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**	= CbTRUE		
					IBS Temperature High Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
					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:		4 seconds out of a 5 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 Low Diagnostic Enable is **TRUE**	= CbTRUE		
					IBS Temperature Low Continuous Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
			Battery Monitor Module ASIC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met:		4 seconds out of a 5 seconds window	
					System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable <		

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**	= CbTRUE		
					IBS Temperature Low Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
					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	< 1.3270 V	VehicleSwitchBankl Diagnostic Enable calibration is **TRUE**	= CbTRUE	4 seconds out of a 5 seconds window	Type B, 2 Trips
					VehicleSwitchBankl Circuit Diagnostic Enable calibration is **TRUE**	= CbTRUE		
					VehicleSwitchBankl Circuit Out-Of-Range Low Diagnostic Enable calibration is **TRUE**	= CbTRUE		

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	> 4.3600 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** If Smart VSB Present is **TRUE,** then foillowing conditions are included RunCrankRelay is TRUE for IGN ON Delay Time	= CbTRUE = CbTRUE = CbTRUE = CbFALSE = 100.00 (ms)	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	1.3270 < sensed voltage < 1.4270 2.9670 < sensed voltage < 3.3480 4.2600 < sensed voltage < 6.0000 7.0000 < sensed voltage < 6.00 7.00 < sensed voltage < 6.00 7.00 < sensed voltage < 6.00 7.00 < sensed voltage < 6.00 7.00 < sensed voltage < 6.00 7.00 < sensed voltage < 4.36	VehicleSwitchBankl Diagnostic Enable calibration is TRUE VehicleSwitchBankl Circuit Diagnostic Enable calibration is TRUE VehicleSwitchBankl Circuit Performance Diagnostic Enable calibration is TRUE	= CbTRUE = CbTRUE = CbTRUE	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 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 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			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 a Static NVM, Perserved NVM, ECC ROM in NVM Flash Region, and Perserved NVM during shut down.	Static NVM region error detected during initialization		Static NVM fault on default diagnostic enable is **CbTRUE** Allow blank BINVDM 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 BINVDM 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 BINVDM 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			Will finish first memory scan within 30 seconds at all engine conditions - 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			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)	

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			Test is Enabled: CbTRUE (If CbFALSE, this test is disabled)	25 ms	Type B, 2 Trips
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: CbTRUE (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: CbTRUE (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Test 1 Voltage Test 2 Voltage Test 3 Voltage Test 4 Voltage	> 0.09 V < -0.09 V > 1.97V < 1.79V > 3.22 V < 3.04 V > 5.09 V < 4.91 V	Arbitrated Battery Voltage	Test is Enabled: CbTRUE (If 0, this test is disabled) > 7.00 V	16 / 20 counts or 822 milliseconds continuous; 50 ms/count in the ECM main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Processor Integrity Performance	P0607	Indicates that the control module has detected an internal processor integrity performance.	Safety critical software is not executed in proper order OR Monitor Task counter exceeds max count threshold (See Enable Conditions for which tasks rates are enabled) 2.5ms: 3.125ms: 5ms: 6.25ms: 10ms: 12.5ms: 20ms: 25ms:	>=5 incorrect task counts OR > 60 max task count >=4 incorrect task counts OR > 48 max task count >=3 incorrect task counts OR > 30 max task count >=2 incorrect task counts OR > 24 max task count >=2 incorrect task counts OR > 15 max task count >=1 incorrect task counts OR > 12 max task count >=1 incorrect task counts OR > 9 max task count >=1 incorrect task counts OR		Test is Enabled: (If CbFALSE, this test is disabled) 2.5ms: CbFALSE 3.125ms: CbFALSE 5ms: CbTRUE 6.25ms: CbFALSE 10ms: CbTRUE 12.5ms: CbFALSE 20ms: CbFALSE 25ms: CbTRUE 40ms: CbFALSE 50ms: CbTRUE 80ms: CbFALSE 100ms: CbTRUE 250ms: CbFALSE	Counts: 2.5ms: 8/10 3.125ms: 8/10 5ms: 8/10 6.25ms: 8/10 10ms: 8/10 12.5ms: 8/10 20ms: 8/10 25ms: 8/10 40ms: 4/5 50ms: 4/5 80ms: 2/3 100ms: 2/3 250ms: 2/3 50 ms/count in the main processor	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				> 6 max task count				
			40ms:	>= 1 incorrect task counts OR > 9 max task count				
			50ms:	>= 1 incorrect task counts OR > 6 max task count				
			80ms:	>= 1 incorrect task counts OR > 12 max task count				
			100ms:	>=2 incorrect task counts OR > 9 max task count				
			250ms:	>= 1 incorrect task counts OR > 6 max task count				

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 89.49 % 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 = CbTRUE = U01B000 = U04B100	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:		40 seconds out of a 50 seconds window	Type B, 2 Trips
					System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is within range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					Temperature Circuit Erratic Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		

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 diagnostic detects non plausible evaporator temperature sensor by comparing the Evaporator Air Temperature with Inlet Air Temperature and Outside Air Temperature once per drive cycle after a long soak time and failing when the absolute difference is too high.	If the absolute value of the differences between Raw Evaporator Air Temperature and the Inlet Air Temperature Sensor Value is	> 20.00 degC	Diagnostic is Enabled		3.2 seconds out of a 4 seconds window	Type B, 2 Trips
					Controller has been awake for a duration greater than (i.e. "Wakeup Pass" is True)	= 25.00 sec		
					OBD Bias Check Enable	= TRUE		
			If the absolute value of the differences between Raw Evaporator Air Temperature and the Outside Air Temperature Sensor Value is	> 15.00 degC	Invalidity Indication of Propulsion System Off Time	= VALID		
					Propulsion System Off Time Don't Use Data Indication	= FALSE		
					Invalidity Indications of Inlet Air Temperature Sensor Value	= VALID		
					Outside Air Temperature Sensor Diagnosti Bundle Fault Active	= FALSE		
					Value of Propulsion System Off Timer is	> 28,800.00 (Seconds)		
					The integrity of the CAN communication is good			
					No Active DTCs	P0538, P0537, P0535, U1611		

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 = CbTRUE = CbTRUE = U01B000 = U04B100 = 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**	= CbTRUE		
					Battery Voltage Out of Range Low Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		

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:		0.25 seconds (200 fails out of 250 samples at 0.001 second loop rate)	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 Voltage Out of Range High Diagnostic Enable is **TRUE**	= CbTRUE		
					Battery Voltage Out of Range High Continuous Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
					Battery Voltage Out of Range High Historical Diagnostic Enable is **FALSE**	= FALSE		
			Battery Monitor Module Circuit Voltage above threshold (Internal IBS Diagnostic)	> 26 Volts	All of the following conditions are met:		1 second	
					System 12V Battery Voltage is above threshold	> 11.00 volts (with		

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**	= CbTRUE		
					Battery Voltage Out of Range High Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		

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 = CbTRUE = CbTRUE = U01B000 = U04B100 = 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**	= CbTRUE		
					IBS Current Out of Range Low Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		

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 = CbTRUE = CbTRUE = U01B000 = U04B100 = 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**	= CbTRUE		
					IBS Current Out of Range High Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		

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 = CbTRUE = CbTRUE = U01B000 = U04B100	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**	= CbTRUE		
					Temperature Circuit Low Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
					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:		4 seconds out of a 5 seconds window	Type B, 2 Trips
					System 12V Battery Voltage is above threshold	> 11.00 volts (with hysteresis disable < 10.00)		
					IBS NormalCommEnable is **TRUE**	= TRUE		
					Outside Air Temperature is within range	> -30.00 degrees Celsius AND < 50.00 degrees Celsius		
					Temperature Circuit High Diagnostic Enable is **TRUE**	= CbTRUE		
					Temperature Circuit High Continuous Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
			Battery Monitor Module NTC Temperature below threshold	<-43.00 degrees Celsius	All of the following conditions are met:		4 seconds out of a 5 seconds window	
					System 12V Battery Voltage is above			

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**	= CbTRUE		
					Temperature Circuit High Historical Diagnostic Enable is **TRUE**	= CbTRUE		
					No Active Lost Communication with Intelligent Battery Sensor Module DTC	= U01B000		
					No Active Battery Sensor Signal Message Counter Incorrect DTC	= U04B100		
					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 = CbTRUE = U01B000 = U04B100	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 = CbTRUE = U01B000 = U04B100	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 = CbTRUE >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 = CbTRUE = FALSE = U01B000 = U04B100	5 seconds out of a 6 seconds window	Type B, 2 Trips
			Any of the following criteria are met IBS Config Return		All of the following conditions are met: System 12V Battery Voltage is above		1 second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Battery Type is NOT equal to Vehicle Battery Type Configuration Battery Nominal Return C20 is above threshold IBS Config Return Battery Cal #1 U40% is above threshold IBS Config Return Battery Cal #2 U80% is above threshold IfSOC Bounding Limit Configuration check is TRUE then following conditions are included SOC Bounding Limit Hr8 Difference is above the threshold SOC Bounding Limit Hr8 Difference is above the threshold SOC Bounding Limit Hr24 Difference is above threshold	NOT equal to Vehicle Battery Type Configuration CeEPM_ADV_BATT_ TECH_AGM >5.00 >0.50 >0.50 = CbTRUE >0.01 >0.01 >0.01	threshold IBS NormalCommEnable is TRUE IBS Configuration Diagnostic Historical Enable is TRUE No Active Lost Communication with Intelligent Battery Sensor Module DTC No Active Battery Sensor Signal Message Counter Incorrect DTC	> 11.00 volts (with hysteresis disable < 10.00) = TRUE = CbTRUE = U01B000 = U04B100		

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.
Engine Compartment Ajar Performance	P257D	The Engine Compartment Ajar Performance diagnostic is performed to diagnose if the input voltage falls in the deadband voltage range.	Hood Switch position is in an invalid(deadband) range.	59.34% <x< 66.96%	The diagnostic is enabled		1 seconds out of a 1.25 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 Compartment Ajar Circuit Low	P257E	The Engine Compartment Ajar Circuit Low diagnostic is performed to diagnose if the input voltage is out of range low or short to ground.	Hood switch low voltage threshold Hood switch position reading is lower than expected bounds.	< 28.54%	The diagnostic is enabled		1 seconds out of a 1.25 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 Compartment Ajar Circuit High	P257F	The Engine Compartment Ajar Circuit High Voltage diagnostic is performed to diagnose if the input voltage is out of range than the highest valid voltage or short to battery.	Hood Switch high voltage threshold Hood Switch position reading is higher than an expected bounds	> 85.2%	The diagnostic is enabled		1 seconds out of a 1.25 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Power Off Timer Performance	P262B	This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active.	Count Up Test: Time difference between the current 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 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 CAN 9 Off	U0078	This DTC monitors for a CAN 9 bus off condition	Bus off failures equals or exceeds	>= 10.00 counts in a sliding window of 50 samples	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 HVAC Control Module	U0164	This DTC monitors for a loss of communication with the HVAC Control Module.	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 10 ms loop	Type B, 2 Trips
			Message $588	> 12,500 milliseconds	Time since power-up reset, running reset, recovery from under/over voltage condition	>=5,000 milliseconds		
			Message $5A7	> 12,500 milliseconds	All below criteria have been met for	>=3,000 milliseconds		
			Message $5A8	> 12,500 milliseconds	If message is on Bus A: U0073 not active			
			Message $5A9	> 12,500 milliseconds	If message is on Bus B: U0074 not active			
			Message $5AA	> 12,500 milliseconds	If message is on Bus S: U0076 not active			
			Message $5AB	> 12,500 milliseconds	If message is on Bus 9: U0078 not active			
			Message $5AC	> 12,500 milliseconds	CAN channel is requesting full communications			
			Message $5AD	> 12,500 milliseconds	Normal CAN transmission on Bus is enabled			
			Message $5AE	> 12,500 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message $5AF	> 12,500 milliseconds	Accessory mode to off mode not pending			
			Message $5B0	> 12,500 milliseconds	Battery voltage	>11.00 Volts		
			Message $5B1	> 12,500 milliseconds	Controller is an OBD controller Or Battery Voltage	<=18.00 Volts		
			Message $5B2	> 12,500 milliseconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Message $5B3	> 12,500 milliseconds	Controller type: OBD Controller			
			Message $5B4	> 12,500 milliseconds	If power mode = Run/Propulsion/Start:			
			Message $5B5	> 12,500 milliseconds	Power Mode is run			
					If power mode = Accessory:			
					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.
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	 >=12,500.00 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 >=10,625.00 milliseconds >=12,500.00 milliseconds >=10,625.00 milliseconds >=12,500.00 milliseconds >=12,500.00	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		
			SD19P_ARC:	8 fail counts out of 10 sample counts	Partial Network is active			
			SrlDat19_Prtctd:	14 fail counts out of 18 sample counts	Power Mode	= Run		
					Battery Voltage	>11.00 Volts		
			SD18P_ARC:	8 fail counts out of 10 sample counts				
			SrlDat18_Prtctd:	14 fail counts out of 18 sample counts				
			VSANDP_ARC:	8 fail counts out of 10 sample counts				
			Veh SpdAvg NDrvn_P rtctd:	14 fail counts out of 18 sample counts				
			VSADP_ARC:	8 fail counts out of 10 sample counts				
			Veh SpdAvg Drvn_P rtctd:	14 fail counts out of 18 sample counts				
			SD21P_ARC:	8 fail counts out of 10 sample counts				
			SriDat21_Prtctd:	14 fail counts out of 18 sample counts				
			SriDat26_Prtctd:	15 fail counts out of 16 sample counts				
				8 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			SD22P_ARC:	10 sample counts				
			SrlDat22_Prtctd:	14 fail counts out of 18 sample counts				
			SD23P_ARC:	15 fail counts out of 16 sample counts				
			SrlDat23_Prtctd:	15 fail counts out of 16 sample counts				
			SD25P_ARC:	8 fail counts out of 10 sample counts				
			SrlDat25_Prtctd:	14 fail counts out of 18 sample counts				
			EHCCI-ARC:	8 fail counts out of 10 sample counts				
			EHCCI_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.
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: TrnsEstGr_Prtctd:	 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:		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		
			SD14P_ARC:	15 fail counts out of 16 sample counts	Partial Network is active			
			SrlDat14_Prtctd:	15 fail counts out of 16 sample counts	Power Mode	= Run		
			SD15P_ARC:	15 fail counts out of 16 sample counts	Battery Voltage	>11.00 Volts		
			SrlDat15_Prtctd:	15 fail counts out of 16 sample counts				
			SD16P_ARC:	8 fail counts out of 10 sample counts				
			SrlDat16_Prtctd:	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 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:		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		
			HVACFCRTLCFLI2_ARC:	8 fail counts out of 10 sample counts	Partial Network is active			
			HVACFCRTLCFRI2_ARC:	8 fail counts out of 10 sample counts	Power Mode	= Run		
					Battery Voltage	>11.00 Volts		
			HVACFCRACH_ARC:	8 fail counts out of 10 sample counts	OBD Manufacturer Enable Counter (MEC)	= 0		
			HVACFCRADSCF_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRADSF_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRBLCFOR_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRBLCF_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRBLF_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRDP_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRRFA_ARC:	8 fail counts out of 10 sample counts				
			HVACFCRTLCFLOR1n2_					

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: BkupSysPwrMode_Prtctd:	 15 fail counts out of 16 sample counts 15 fail counts out of 16 sample counts	Time since power-up reset, running reset, recovery from under/over voltage condition All the following conditions are met for Partial Network is active Power Mode Battery Voltage	>= 5,000 milliseconds >= 3,000 milliseconds = Run >11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Radio	U0485	This DTC monitors for an error in communication with the CSM	Any of the Alive Rolling Counts, Protection Values, Checksum Values, or Cyclic Redundancy Check signal values listed below are incorrect for:		Time since power-up reset, running reset, recovery from under/over voltage condition		Executes in 10ms loop.	Type C, 1 Trip No MIL Emissions Neutral "Emissions Neutral Diagnostic - Type C"
					All the following conditions are met for	>= 5,000 milliseconds		
			SD226_ARC:	8 fail counts out of 10 sample counts	Partial Network is active	>= 3,000 milliseconds		
			SD216_ARC:	8 fail counts out of 10 sample counts	Power Mode	= Run		
					Battery Voltage	>11.00 Volts		
			SD225_ARC:	8 fail counts out of 10 sample counts				
			SD223_ARC:	8 fail counts out of 10 sample counts				
			SD221_ARC:	8 fail counts out of 10 sample counts				
			HMIGI3P_ARC:	15 fail counts out of 16 sample counts				
			HMIGenInfo3_Prtctd:	15 fail counts out of 16 sample counts				
			SD220.ARC:	8 fail counts out of 10 sample counts				
			SD219_ARC:	8 fail counts out of 10 sample counts				
			SD218_ARC:	8 fail counts out of 10 sample counts				
			HVACICR1_ARC:	8 fail counts out of 10 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.
			HVACICR1_CS: HVACICR2_ARC: HVACICR2_CS: SD222_ARC: SD224_ARC: SD217_ARC:	18 sample counts 8 fail counts out of 10 sample counts 14 fail counts out of 18 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				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Battery Monitor Module	U04B1	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.
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 AHDA03_Rsp_PDU	>=11,500.00 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 AHDA05_Rsp_PDU	>=11,500.00 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.
Virtual Cockpit Unit Invalid Data Received from Fully Integrated Display Module Touchscreen	U13F9	This diagnostic monitors invalid touchscreen data received from the Virtual Cockpit Display (VCD) module. The Vehicle Cockpit Unit (VCU, smart device) monitors invalid data received from the VCD over I2C protocol, and communicates instantaneous failures to the diagnosing controller where the diagnostic is matured and stored in a DTC.	Invalid VCD data detected from Diagnostic Status 1 or Diagnostic Status 2 packets (as evaluated by the VCU smart device)	= TRUE	Diagnostic is enabled VCU Data Received from VCD The integrity of the CAN communication is good No DTCs:	 = TRUE U164E, U0485	4 seconds out of a 5 seconds window	Type C, 1 Trip No MIL Emissions Neutral
			Invalid VCD data detected from Touch Diagnostic Status packet (as evaluated by the VCU smart device)	= TRUE	Diagnostic is enabled VCU Data Received from VCD The integrity of the CAN communication is good No DTCs:	 = TRUE U164E, U0485	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.
Body Control Module Local Interconnect Network 6	U152A	This DTC monitors for a loss of communication on the LIN bus.	All Slaves calibrated as present on this LIN bus are reporting Loss of Communication.		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: If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD	 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.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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.	All Slaves calibrated as present on this LIN bus are reporting Loss of Communication.		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.	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 $03B Message $27B Message $369 Message $3A8 Message $5CD	 >10,025.00 milliseconds >10,250.00 milliseconds >10,625.00 milliseconds >10,625.00 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 If message is on Bus 9: U0078 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	 >=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.
					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 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 $514 Message $0E2 Message $516 Message $268 Message $02F Message $049 Message $064 Message $262 Message $266 Message $267 Message $36F Message $521 Message $5CE	 >12,500.00 milliseconds >10,062.50 milliseconds >12,500.00 milliseconds >10,250.00 milliseconds >10,031.25 milliseconds >10,031.25 milliseconds >10,031.25 milliseconds >10,250.00 milliseconds >10,250.00 milliseconds >10,250.00 milliseconds >10,625.00 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 If message is on Bus 9: U0078 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	 >=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 $5E3 Message $5EB	>12,500.00 milliseconds >12,500.00 milliseconds	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 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 Central Gateway Module on CAN Bus 9	U1627	This DTC monitors for a loss of communication with Central Gateway Module.	Message is not received from controller for Message $2D0 Message $370 Message $3A4 Message $3AB Message $5CC Message $5D7 Message $04B Message $700 Message $585 Message $598 Message $4F3	> 10,250.00 milliseconds > 10,625.00 milliseconds > 10,625.00 milliseconds > 11,250.00 milliseconds > 12,500.00 milliseconds > 12,500.00 milliseconds > 10,025.00 milliseconds > 12,500.00 milliseconds > 12,500.00 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 If message is on Bus 9: U0078 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	>=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.
					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 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 Transmission Control Module on CAN Bus 2	U1643	This DTC monitors for a loss of communication with the Transmission Control Module.	Message is not received from controller for Message $032	>10,031.25 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 If message is on Bus 9: U0078 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	>=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.
					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 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 Center Stack Module/Low Radio/ Vehicle Cockpit Unit on CAN Bus 5	U164E	This DTC monitors for a loss of communication with the Center Stack Module, Low Radio, or Vehicle Cockpit Unit.	Message is not received from controller for Message $2E0 Message $4F0 Message $4F1 Message $4F2 Message $505 Message $519 Message $539 Message $53B Message $53D Message $5B6 Message $5B7 Message $5D0 Message $708	 >10,500.00 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 >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 If message is on Bus 9: U0078 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	 >=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 $709 Message $70A	>12,500.00 milliseconds >12,500.00 milliseconds	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 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 ECM/PCM A on Bus B	U1818	This DTC monitors for a Lost Communication with Engine Control Module on CAN Bus B error as determined by the BCM.	Message is not received from controller for Message $024	 >10,031.25 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 If message is on Bus 9: U0078 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	 >=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.
					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 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 Boolean		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 Boolean		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 for	60 seconds	Calibration enable	= CbTRUE Boolean	60 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Vehicle Cockpit Unit Lost Communication with Fully Integrated Display Module Touchscreen	U223B	This diagnostic monitors loss of communication of touchscreen data from the Virtual Cockpit Display (VCD) module. The Vehicle Cockpit Unit (VCU, smart device) monitors loss of communication from the VCD over I2C protocol, and communicates communication status to the diagnosing controller (where the diagnostic is matured and stored in a DTC) when the VCU has not received the message for2.5x of its periodic rate.	Data received status from VCD Diagnostic Status 1 or Diagnostic Status 2 packets (as evaluated by the VCU smart device)	= FALSE	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	U164E, U0485	4 seconds out of a 5 seconds window	Type C, 1 Trip No MIL Emissions Neutral
			Data received status from VCD Touch Diagnostic Status packet (as evaluated by the VCU smart device)	= FALSE	Diagnostic is enabled The integrity of the CAN communication is good No DTCs:	U164E, U0485	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.
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	> 4.00	PowerA - Power B Correlation monitoring enable = TRUE Battery Present is **CbTRUE** Starter Motor NOT Engaged	CbTRUE 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(s)	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bus-Off detected on Communication CAN Bus 1	U007500	This fault is set if Communication CAN Bus 1 enters the Bus-Off state	Bus Off Event on CAN Bus 1 FOR	= TRUE >= 5.0 seconds	U007500_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Control Module Communication Bus Off Power Mode Time	2.0 sec for pass 5.0 sec for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 2	U007300	This fault is set if Communication CAN Bus 2 enters the Bus-Off state	Bus Off Event on CAN Bus 2 FOR	= TRUE >= 5.0 seconds	U007300_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Control Module Communication Bus Off Power Mode Time	2.0 sec for pass 5.0 sec for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 3	U007400	This fault is set if Communication CAN Bus 3 enters the Bus-Off state	Bus Off Event on CAN Bus 3 FOR	= TRUE >= 5.0 seconds	U007400_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Control Module Communication Bus Off Power Mode Time	2.0 sec for pass 5.0 sec for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 5	U007B00	This fault is set if Communication CAN Bus 5 enters the Bus-Off state	Bus Off Event on CAN Bus 5 FOR	= TRUE >= 5.0 seconds	U007B00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Control Module Communication Bus Off Power Mode Time	2.0 sec for pass 5.0 sec for fail	Type B 2 Trips
Bus-Off detected on Communication CAN Bus 9	U007800	This fault is set if Communication CAN Bus 9 enters the Bus-Off state	Bus Off Event on CAN Bus 9 FOR	= TRUE >= 5.0 seconds	U007800_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Control Module Communication Bus Off Power Mode Time	2.0 sec for pass 5.0 sec for fail	Type B 2 Trips
Lost Communication with DEFC Detected	U010E00	This monitoring shall check a supervised message from the DEFC for communication status. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U010E00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with ECP_MC Detected	U011000	This monitoring shall check a supervised message from the ECP_MC for communication status. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U011000_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = 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(s)	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with BSM_MH Detected	U011100	This monitoring shall check a supervised message from the BSM_MH for communication status. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U011100_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with BCM Detected	U014000	This monitoring shall check a supervised message from the BCM for communication status. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U014000_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with HVAC_? Detected	U016400	This monitoring shall check a supervised message from the HVAC_? for communication status. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U016400_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with LIBI Detected	U01BF00	This monitoring shall check a supervised message from the LIBI for communication status. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U01BF00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with VICM Detected on CAN2	U160D00	This monitoring shall check a supervised message from the VICM for communication status on CAN channel 2. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U160D00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with BSM Detected on CAN3	U160E00	This monitoring shall check a supervised message from the BSM for communication status on CAN channel 3. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U160E00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with EBCM Detected on CAN2	U161000	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 per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U161000_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = 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(s)	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with ECM Detected on CAN2	U161100	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 per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U161100_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with ECP_X1Detected on CAN2	U161200	This monitoring shall check a supervised message from the ECP_X1for communication status on CAN channel 2. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U161200_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with ECP_X1Detected on CAN3	U161300	This monitoring shall check a supervised message from the ECP_X1for communication status on CAN channel 3. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U161300_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with VICM Detected on CAN9	U163500	This monitoring shall check a supervised message from the VICM for communication status on CAN channel 9. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U163500_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with EBCM Detected on CAN3	U163900	This monitoring shall check a supervised message from the EBCM for communication status on CAN channel 3. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U163900_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with SIB Detected on CAN1	U163C00	This monitoring shall check a supervised message from the SIB for communication status on CAN channel 1. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U163C00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with TCM Detected on CAN2	U164300	This monitoring shall check a supervised message from the TCM for communication status on CAN channel 2. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U164300_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = 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(s)	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with CSM Detected on CAN5	U164E00	This monitoring shall check a supervised message from the CSM for communication status on CAN channel 5. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U164E00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with VECM Detected on CAN2	U165B00	This monitoring shall check a supervised message from the VECM for communication status on CAN channel 2. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U165B00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with VECM Detected on CAN9	U165C00	This monitoring shall check a supervised message from the VECM for communication status on CAN channel 9. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U165C00_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Lost Communication with ECM Detected on CAN3	U181800	This monitoring shall check a supervised message from the ICCM for communication status. If the CGM has not received the message per the malfunction criteria and threshold values and subject to the secondary parameters and enable conditions, 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	U181800_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= k_Lost Communication Power Mode Time	6.5 sec	Type B 2 Trips
Key Table Not Provisioned	U196000	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.	All key slots are provisioned OR Receipt of ERC_KEY_EMPTY from security peripheral	= False	In Vehicle Message Authentication Supported Vehicle Supply Voltage	= True >= k_Battery Voltage Low Threshold (7V)	250 msec	Type B 2 Trips
Security Peripheral Performance	U196100	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 internal fault	= True	Vehicle Supply Voltage Any participating Partial Network FOR	>= k_Battery Voltage Low Threshold (7V) = Active >= 5 seconds	Immediate upon fault. 50 msec task interval.	Type B 2 Trips
Serial Data Message Authentication Failure	U196200	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-1 messages on a failed key slot authenticate, the fault is cleared.	Serial data authentication failure instances on a key slot	>= K_ERRH_C_FailedAuthentication Counter for the slot	In Vehicle Message Authentication Supported Vehicle Supply Voltage U196100 is set Any participating Partial Network FOR	= True >= k_Battery Voltage Low Threshold (7V) = False = Active >= 5 seconds	Depends on calibration setting (count of authentication errors).	Type B 2 Trips
BCM Invalid Data	U042200	This diagnostic monitors for serial data messages from the BCM with safety, security, protection or continuous operation failures. An adjustable debounce strategy (ex. X of Y) is used.	BCM serial data - MAC or ARC- failure instances	>= X of Y	U042200_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= 5 seconds	Depends on calibration setting (count of invalid messages).	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value(s)	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM Invalid Data	U040100	This diagnostic monitors for serial data messages from the ECM with safety, security, protection or continuous operation failures. An adjustable debounce strategy (ex. X of Y) is used.	ECM serial data - MAC or ARC - failure instances	>= X of Y	U040100_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= 5 seconds	Depends on calibration setting (count of invalid messages).	Type B 2 Trips
TCM Invalid Data	U040200	This diagnostic monitors for serial data messages from the TCM with safety, security, protection or continuous operation failures. An adjustable debounce strategy (ex. X of Y) is used.	TCM serial data - MAC or ARC - failure instances	>= X of Y	U040200_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= 5 seconds	Depends on calibration setting (count of invalid messages).	Type B 2 Trips
BSCM Invalid Data	U041800	This diagnostic monitors for serial data messages from the BSCM with safety, security, protection or continuous operation failures. An adjustable debounce strategy (ex. X of Y) is used.	BSCM serial data - MAC or ARC - failure instances	>= X of Y	U041800_ENABLE Vehicle Supply Voltage Any participating Partial Network FOR	= "enabled" >= k_Battery Voltage Low Threshold (7V) = Active >= 5 seconds	Depends on calibration setting (count of invalid messages).	Type B 2 Trips
ECU Identification Self Learn Not Completed	U197700	This diagnostic indicates when the self learn execution has not completed.	Self learn execution not completed	= TRUE	k_CGM Self Learn Did Not Execute Diagnostic Enable Vehicle Supply Voltage Any participating Partial Network FOR	= True >= k_Battery Voltage Low Threshold (7V) = Active >= k_CGM Self Learn Did Not Execute Power Mode Time	Monitored at task interval of 50 msec.	Type B 2 Trips
ECU Identification Self Learn Invalid	U198B00	This diagnostic indicates when the ECU Identification List has become corrupted or the VIN does not match.	ECU Identification List NVM Corruption Diagnostic Fault OR VIN Mismatch Fault	= Active = Active	k_CGM Self Learn Invalid Diagnostic Enable Vehicle Supply Voltage Any participating Partial Network FOR	= True >= k_Battery Voltage Low Threshold (7V) = Active >= k_CGM Self Learn Invalid Power Mode Time	Monitored at task interval of 100 msec.	Type B 2 Trips
Control Module General Memory Failure	U35B900	The CGM shall mature this DTC when Self-Learn has completed but the diagnostic address list cannot be restored from NVM.	Diagnostic address list cannot be restored from NVM	= TRUE	U35B900_ENABLE Vehicle Supply Voltage	= "enabled" >= k_Battery Voltage Low Threshold (7V)	At start-up (ignition off to run or propulsion)	Type B 2 Trips
Internal Control Module Random Access Memory (RAM)	P060400	This DTC is set when a RAM ECC failure is detected. This is run upon start-up.	RAM ECC failure detected	= TRUE	None.		Immediately upon start-up when fault detected.	Type B 2 Trips
Internal Control Module Read Only Memory (ROM)	P060500	This DTC is set when a ROM ECC failure is detected. This is run upon start-up.	ROM ECC failure detected	= TRUE	None.		Immediately upon start-up when fault detected.	Type B 2 Trips
Vehicle Identification Number - Not Programmed	U2C9100	At the beginning of each ignition cycle, confirm that the VIN contains valid characters.	Any character in the VIN	= {0x00 - 0x29, 0x40, 0x49, 0x4F, 0x51, 0x5B - OxFF}	U2C9100_ENABLE	= "enabled"	Immediately upon start-up when fault detected.	Type B 2 Trips

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value(s)	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Vehicle Identification Number - Invalid, Incompatible or Mismatches Published VIN	C054600	At the beginning of each ignition cycle, confirm that the VIN has been programmed and matches what is sent on CAN9.	All characters in the VIN	= VIN signal sent via CAN9	C054600_ENABLE	= "enabled"	Immediately upon start-up when fault detected.	Type B 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Brake Booster Internal Power Driver										
Brake Booster Internal Power Driver Range/Performance	C0595	ALL	This monitoring checks if the B6 Bridge Driver ASIC does not answer properly to the uC test during initialization.	B6 Bridge Driver ASIC is not fault free during the initial test	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks the operation mode of the B6 bridge driver ASIC.	B6 bridge driver ASIC is not fault free during the operation mode OR ASIC is not in valid operation mode OR MOSFET Short circuit failure bit is set	= True = True = True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the voltage drops at actuated MOSFET is too high.	Voltage across the unactuated MOSFET	>-0.21 M	Ignition state ON AND During initialization	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks the bridge driver operational state continuously.	Motor is not available due to reinitialization	= True	Ignition state ON OR Undervoltage situation of bridj	= True = True	0.1 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Circuit Range/Performance	C0582	ALL	This monitoring checks if the measured voltage on an idle MOSFET is not in mid-level.	Measured voltage at idle	<> 1.65 M	Ignition state ON AND During initialization	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if MOSFETs of Bridge Driver can be controlled and actuated properly.	Ratio between BMS MON to UBB when BMS switched on OR Ratio between BMS_MON to UB6 when BMS_RVP is switched on OR BMS MON voltage when BMS is switched off OR BMS MON voltage when BMS RVP is switched off OR Ratio between BRS_MON to UB_RD_INT when BRS switched on OR Ratio between BRS_MON to UB6 when BRS_RVP is switched on OR BRS MON voltage when BRS is switched off OR BRS MON voltage when BRS RVP is switched off	< 80 [%] < 80 [%] >3.5 M >3.5 M < 80 [%] < 80 [%] >3.5 M >3.5 M	Ignition state ON AND Failsafe logic test is finished	= True = True	5[s]	Once	Type A, 1 Trip
Brake Booster Temperature Sensor A										
Brake Booster Temperature Sensor "A" Circuit High	P25C7	ALL	This monitoring checks if the BLM Temperature Signal 1 is shorted to Supply.	Temperature Sensor 1 signal voltage value AND For a consecutive number of times	>3.27 M = 5	Ignition state ON	= True	0.6 [s]	Continuous	Type B, 2 Trips
Temperature sensor z signal vcltaqe value										
Brake Booster Temperature Sensor "A" Circuit Low	P25C6	r	This monitoring checks if the BLM Temperature Signal 1 is shorted to Ground.	Temperature Sensor 1 signal voltage value AND For a consecutive number of times	r	Ignition state ON	= True	0.6 [s]	Continuous	Type B, 2 Trips
Brake Booster Temperature Sensor B										
Brake Booster Temperature Sensor "B" Circuit High	C057A	ALL	This monitoring checks if the BLM Temperature Signal 2 is shorted to Supply.	AND For a consecutive number of times	>3.14 M = 5	Ignition state ON	= True	0.6 [s]	Continuous	Type B, 2 Trips
Brake Booster Temperature Sensor "B" Circuit Low	C0579	r	This monitoring checks if the BLM Temperature Signal 2 is shorted to Ground.	Temperature Sensor 2 signal voltage value AND For a consecutive number of times	<0.03M 5	Ignition state ON	= True	0.6 [s]	Continuous	Type B, 2 Trips
Brake Master Cylinder Pressure Sensor										
Brake Master Cylinder Pressure Sensor	C2A16	r	This monitoring checks if the DS 10 pressure sensor SENT line is shorted to supply or SENT line is open.	No valid SENT messages received for time AND	>0.1 [si	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Communication Failure				Digital level of SENT line is high	= True					
		ALL	This monitoring checks if the DS 10 pressure sensor SENT line is shorted to ground or the sensor supply is interrupted.	No valid SENT messages received for time AND Digital level of SENT line is low	>0.1 [si = True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is transmission error on SENT line.	Transmission error on SENT line	= True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor "C" Circuit High	C0572	ALL	This monitoring checks if pressure value measured by DS 10 pressure sensor is at its maximum value.	Pressure value	= 30000 [kPa]	Ignition state ON	= True	0.96 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor "C" Circuit Low	C0571	ALL	This monitoring checks if pressure value measured by DS 10 pressure sensor is at its minimum value.	Pressure value	=-1480 [kPa]	Ignition state ON	= True	0.96 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor "C" Circuit Range/Performance	C0574	ALL	This monitoring checks if the offset value of pressure sensor 1 is correct.	Offset value	> 12 [barl	Ignition state ON AND Brake Pedal is released AND Acceleration AND Vehicle speed AND No active pressure build up by IPB-system	= True = True > 0 [m/s^2] >4.47 [mph] = True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the DS 10 pressure sensor sends an error code on line 2 via SENT protocol.	Pressure sensor detects a failure	= True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
Brake Pedal Position Sensor A										
Brake Master Cylinder Piston Position Sensor "A" Circuit Range/Performance	C05CC	ALL	This monitoring checks if the offset of channel 1 of the Pedal Travel Sensor is out of defined range.	Push rod stroke offset OR Push rod stroke offset	> 1.1 [mm] < -1.5 [mm]	Ignition state ON AND PTS AND Brake Pedal AND Hydraulic Intervention EPS ACC AND Vehicle velocity AND Acceleration	= True = Fault free = Completely released = No intervention > Standstill (4.47 mph) > 0 [m/s^2]	0.1 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is transmission error on the SENT line.	LIPS detects a failure	= True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor "A" Circuit Voltage High	C05CA	ALL	This monitoring checks if the LIPS sends an out of range high failure information via the slow channel of the SENT protocol.	Slow channel error code shows an out-of-range high	= True	Ignition state ON	= True	0.96 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor "A" Circuit Voltage Low	C05CB	ALL	This monitoring checks if the LIPS sends an out of range low failure information via the slow channel of the SENT protocol.	Slow channel error code shows an out-of-range low	= True	Ignition state ON	= True	0.96 [s]	Continuous	Type A, 1 Trip
Internal Communication Fault with Brake Master Cylinder Piston Position Sensor 1	C2A13	ALL	This monitoring checks if the ID of the Linear position sensor is received in time.	ID of the Linear position sensor is not received on time	>1.5 [s]	Ignition state ON	= True	0.5 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the SENT line is shorted to supply.	No valid SENT messages received for time AND Digital level of SENT line is high	>0.1 [si = True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the SENT line is shorted to ground.	No valid SENT messages received for time AND Digital level of SENT line is low	>0.1 [si = True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is transmission error on SENT line.	Transmission error on SENT line	= True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Brake Pedal Position Sensor B										
Brake Master Cylinder Piston Position Sensor "A/B" Correlation	C05D0	ALL	This monitoring checks whether the difference between PTS1 and PTS2 signal is too high.	IPTS1 signal -PTS2 signal|	> 1.5 [mm]	Ignition state ON AND Sensor Channel 1 and Channel 2 AND Sensor Channel 1 and Channel 2	= True = Initialized = Fault free	0.12 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the brake pedal and the gas throttle are pressed at the same time by the driver for a defined input and time.	Brake input rod stroke AND Gas throttle	> 3 [mm] > 20 [%1	Ignition state ON AND Vehicle speed AND Accelerator pedal applied (accelerator pedal status) signal is available and valid	= True >4.47 [mph] = True	240 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor "B" Circuit Range/Performance	C05CF	ALL	This monitoring checks if the offset of channel 2 of the Pedal Travel Sensor is out of defined range.	Push rod stroke offset AND Push rod stroke offset	> 1.1 [mm] < -1.5 [mm]	Ignition state ON AND PTS AND Brake Pedal AND Hydraulic Intervention EPS ACC AND Vehicle velocity AND Acceleration	= True = Fault free = Completely released = No intervention > Standstill (4.47 mph) > 0 [m/s^2]	0.1 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor "B" Circuit Voltage High	C05CD	ALL	This monitoring checks if the PWM line is shorted to supply.	Permanent line high value detected on LiPS PWM signal line	= True	Ignition state ON	= True	0.2 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Piston Position Sensor "B" Circuit Voltage Low	C05CE	ALL	This monitoring checks if the PWM line is shorted to ground.	Permanent line low value detected on LiPS PWM signal line	= True	Ignition state ON	= True	0.2 [s]	Continuous	Type A, 1 Trip
Internal Communication Fault with Brake Master Cylinder Piston Position Sensor 2	C2A14	ALL	This monitoring checks if there is transmission error at PWM line.	PWM frequency OR PWM frequency OR PWM duty cycle OR PWM duty cycle	< 900 [Hz] >1120 [Hz] <8.5 [%] > 92 [%]	Ignition state ON	= True	0.2 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor										
Brake Pressure Sensor "A" Circuit High	C053F	ALL	This monitoring checks difference between the measured pressure from the plunger pressure sensor and the calculated pressure based on motor torque, angular acceleration and best-case gear efficiency.	Difference between the measured pressure and the calculated pressure	> calculated max pressure + 25 [%] from measured pressure. At least 20 [bar] robustness margin.	Ignition state ON AND Motor speed	= True > 3 [rad/s]	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if pressure value measured by DS 10 pressure sensor is at its maximum value.	Pressure value	= 30000 [kPa]	Ignition state ON	= True	0.96 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor "A" Circuit Low	C053E		This monitoring checks if pressure value measured by DS 10 pressure sensor is at its minimum value.	Pressure value	=-1480 [kPa]	Ignition state ON	= True	0.96 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor "A" Range/Performance	C053D		This monitoring checks if the offset value of pressure sensor 2 is correct.	Offset value	|>12[bar]	Ignition state ON AND	= True	Immediately	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Brake Pedal is released	= True			
		ALL	This monitoring checks if there is transmission error at SENT line.	SENT internal error code is received from sensor	= True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
Brake Pressure Sensor Communication Failure	C2A15	ALL	This monitoring checks if the DS 10 pressure sensor SENT line is shorted to supply or SENT line is open.	No valid SENT messages received for time AND Digital level of SENT line is high	> 0.1 [s] = True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the DS 10 pressure sensor SENT line is shorted to ground or the sensor supply is interrupted.	No valid SENT messages received for time AND Digital level of SENT line is low	> 0.1 [s] = True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is transmission error on SENT line.	Transmission error on SENT line	= True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
Brake System Plunger Motor										
Brake Booster Motor "A" Over Temperature	C05C2	ALL	This monitoring checks if Brake System plunger motor temperature is overheated.	Motor torque is limited because of torque limitation (high temperature, or low voltage / current limitation) AND Replenishment cannot finish successfully	= True = True	Ignition state ON AND Torque limitation AND Replenishment Actual Pressure is less than Target Pressure	= True = True = True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the rotor or ECU temperature is higher than a defined level.	ECU temperature	> 120 [°C]	Ignition state ON AND Brake Booster Temperature Sensors	= True = Fault free	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the rotor or ECU temperature is higher than a defined level.	ECU temperature	> 142 [°C]	Ignition state ON AND Brake Booster Temperature Sensors	= True = Fault free	Immediately	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Performance	C0594	ALL	This monitoring checks if the plunger can reach the mechanical backward bound.	Plunger travel	> Plunger length	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if motor test detects hardware failure.	Motor test detects HW failure	= True	Ignition state ON AND Motor is actuated	= True = False	0.01 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if the motor movement is sufficient according to the expected pressure value.	Pressure sensor 2 value AND Calculated pressure - Pressure sensor 2 value	> 10 [bar] > 40 [bar]	Ignition state ON	= True	0.015 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the motor movement is sufficient according to the expected pressure value.	Calculated pressure - Pressure sensor 2 value OR Pressure sensor 2 value - Calculated pressure	> 40 [bar] > 108 [bar]	Ignition state ON	= True	0.2 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Circuit/Open	C057F	ALL	This monitoring checks the motor coil resistance value.	Measured motor coil resistance	> 0.20358 [Ohm]	Ignition state ON	= True	0.12 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks the motor coil resistance value.	Measured motor coil resistance	< 0.01258 [Ohm]	Ignition state ON	= True	0.12 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the voltage vector is plausible.	Actual voltage vector - Calculated voltage vector	> 1.5 [V]	Ignition state ON	= True	0.02 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Current High	C0590	ALL	This monitoring checks if there is a Current Measurement 1 offset high failure at ADC internal shunt 1.	Measured current offset derived from ADC internal shunt	> 38 [A]	Ignition state ON AND Electric motor is not actuated	= True = True	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a Current Measurement 2 offset high failure at ADC internal shunt 2.	Measured current offset derived from ADC internal shunt	> 38 [A]	Ignition state ON AND Electric motor is not actuated	= True = True	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Current Measurement 1 value at B6 bridge at ADC internal shunt is too high.	Measured current derived from ADC internal shunt	> 200 [A]	Ignition state ON	= True	0.3 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Current Measurement 2 value at B6 bridge at ADC internal shunt is too high.	Measured current derived from ADC internal shunt	> 200 [A]	Ignition state ON	= True	0.3 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Current Low	C0591	ALL	This monitoring checks if there is a Current Measurement 1 offset low failure at ADC internal shunt 1.	Measured current offset derived from ADC internal shunt	< -38 [A]	Ignition state ON AND Electric motor is not actuated	= True = True	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a Current Measurement 2 offset low failure at ADC internal shunt	Measured current offset derived from ADC internal shunt	< -38 [A]	Ignition state ON AND	= True	0.2 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
			2.			Electric motor is not actuated	= True			
		ALL	This monitoring checks if the Current Measurement 1 value at B6 bridge at ADC internal shunt is too low.	Measured current derived from ADC internal shunt	< -200 [A]	Ignition state ON	= True	0.3 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Current Measurement 2 value at B6 bridge at ADC internal shunt is too low.	Measured current derived from ADC internal shunt	< -200 [A]	Ignition state ON	= True	0.3 [s]	Continuous	Type A, 1 Trip
Brake System Plunger Motor Position Sensor										
Brake Booster Motor "A" Position Sensor Circuit High	C0589	ALL	This monitoring checks if the RPS cosine signal is out of range high.	Raw Cos ADC Value (Cos+ or Cos-)	>4075	Ignition state ON	= True	0.15 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the RPS Sinus signal is out of range high.	Raw Sin ADC Value (Sin+ or Sin-)	> 4075	Ignition state ON	= True	0.15 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the vector length value of RPS is out of range high.	Calculated vector length sqrt(sin^2+cos^2)	>1.14	Ignition state ON	= True	0.01 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Position Sensor Circuit Low	C0588	ALL	This monitoring checks if the RPS cosine signal is out of range low.	Raw Cos ADC Value (Cos+ or Cos-)	< 10	Ignition state ON	= True	0.15 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the RPS Sinus signal is out of range low.	Raw Sin ADC Value (Sin+ or Sin-)	< 10	Ignition state ON	= True	0.15 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the vector length value of RPS is out of range low.	Calculated vector length sqrt(sin^2+cos^2)	<0.25	Ignition state ON	= True	0.0025 [s]	Continuous	Type A, 1 Trip
Brake Booster Motor "A" Position Sensor Circuit Range/Performance	C058A	ALL	This monitoring checks whether one single sensor signal line deviates from the other three sensor signal lines.	Sensor signal line deviation*	> defined formula based on dynamic threshold	Ignition state ON	= True	10.0025 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there are implausible angle Humps.	Absolute difference of filtered and unfiltered motor speed	>711.2 [rad/s]	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the ratio of the RPS vector length and sums signals is plausible.	Ratio of the RPS vector length and sums signals*	>0.1	Ignition state ON	= True	0.010 [s]	Continuous	Type A, 1 Trip
CAN Bus A										
Control Module Communication HS CAN Bus Off	U0073	ALL	This monitoring checks if the CAN controller on HS bus channel is in a Bus Off state.	BusOff status has been detected	= True	Ignition state ON	= True	0.240 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if there is a timeout failure caused by HW-Error.	Expected action has not occurred within its allowed time	= True	Ignition state ON AND A CAN controller request has been issued	= True = True	Immediately	Continuous	Type B, 2 Trips
Invalid Data Received From ECM	U0401	ALL	This monitoring checks if the signal 'Electronic Shift Braking Request Alive Rolling Count[1] of the message ETRS_General_Request_2_HS message counter from ECMHS (Engine Control Module) is received with the expected value.	Number of consecutive occasions when the current value of the Alive Rollina Count is the same as the previous value	>= 10(+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message ETRSGeneralRequest_2_HS (0x368) is received	= True = True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the signal 'Electronic Shift Braking Request Protection Value' of the message ETRS_General_Request_2_HSECM_HS checksum from ECM HS (Engine Control Module) is received with the expected value.	Number of consecutive instances where the received checksum does not correspond to the expected checksum	>= 10(+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message ETRSGeneralRequest_2_HS (0x368) is received	= True = True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the value of the signal 'HillDscntCtrlSwStatARC (Hill Descent Control Switch Status Alive Rolling Count) of the message PPEI_Engine_Torque_Status_2 is received with the expected value.	Number of consecutively received invalid signals	>= 10(+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message PPEI_Engine_Torque_Status_2(0x1C3) is received	= True = True = True	0.25 [s]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		ALL	This monitoring checks if the value of the signal 'HillDscntCtrlSwStatPVal' (Hill Descent Control Switch Status Protection Value) of the message PPEI_Engine_Torque_Status_2 is received with the expected value.	Number of consecutively received invalid signals	>= 10(+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message PPEI_Engine_Torque_Status_2(0x1C3) is received	= True = True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the signal 'Commanded Axle Torque Alive Rolling Count' of the message PTEIAxleTorqueCommand message counter from ECMHS (Engine Control Module) is received with the expected value.	Number of consecutive occasions when the current value of the Alive Rolling Count is the same as the previous value	>= 25 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message PTEI_Axle_Torque_Command_HS(OxAA) is received	= True = True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the signal 'Commanded Axle Torque Predicted Protection Value' of the message PTEI Axle Torque Command checksum from ECM HS (Engine Control Module) is received with the expected value.	Number of consecutive instances where the received checksum does not correspond to the expected checksum	>= 25 (+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message PTEI_Axle_Torque_Command_HS(OxAA) is received	= True = True = True	0.25 [s]	Continuous	Type B, 2 Trips
Invalid Data Received From TCM	U0402	ALL	This monitoring checks if the signal 'Chassis System Brake Blending Axle Torque Achieved Alive Rolling Counter' of the message Control_Regenerative_Brake_Trq_2 message counter from TCMHS (Transmission Control Module) is received with the expected value.	Number of consecutive occasions when the current value of the Alive Rolling Count is the same as the previous value	>= 10(+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message Control_Regenerative_Brake_Trq HS (0x1C9) is received	= True = True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the signal 'Chassis System Brake Blending Axle Torque Achieved Protection Value' of the message Control_Regenerative_Brake_Trq_2 checksum from TCM HS (Transmission Control Module) is received with the expected value.	Number of consecutive instances where the received checksum does not correspond to the expected checksum	>= 10(+2/step)	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage) AND New message Control_Regenerative_Brake_Trq HS (0x1C9) is received	= True = True = True	0.25 [s]	Continuous	Type B, 2 Trips
Lost Communication With ECM	U0100	ALL	This monitoring checks if the message ETRSGeneralRequest_2_HSECM_HS from ECM_HS (Engine Control Module) is received within the specified cycle time.	Messaae is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI_Drv_Pref_Mode_Switch_Status from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI_Engine_General_Status_1 from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message	Message is not received for time	>= 1.25 [si	Ignition state ON	= True	1.25 [s]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
			PPEI_Engine_General_Status_4 from ECMHS (Engine Control Module) is received within the specified cycle time.			AND Communication related conditions fulfilled (No error passive, no undervoltage)	 = True			
		ALL	This monitoring checks if the message PPEI_Engine_General_Status_6 from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.50 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI_Engine_Torque_Status_2 from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI_Engine_Torque_Status_3 from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.50 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI_Propulsion_Gen_Stat_1_HS from ECM HS (Engine Control Module) (HCP_HS/ ECM_HS/ BCP HS/ HCPBHS/ HCP_T_HS) is received within the specified cycle time.	Message is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI_Propulsion_Sys_Gen_Status from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 1.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	1.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEITorqueRequestStatus from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI Trans_General_Status_2ECM HS from ECM_HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.5 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.5 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI Vehicle Speed and Distance from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 2.5 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	2.5 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PTEI Axle Torque Command from ECM HS (Engine Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
Lost Communication With Gateway "A" (CGM)	U0146	ALL	This monitoring checks if the message PPEI CGM General Status HS from CGM HS (Central Gateway Module) is received within the specified cycle time.	Message is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
Lost Communication With TCM	U0101	ALL	This monitoring checks if the message Control_Regenerative_Brake_Trq_2 from TCMHS (Transmission Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.25 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.25 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message PPEI_Trans_General_Status_2TCM_HS from TCM HS (Transmission Control Module) is received within the specified cycle time.	Message is not received for time	>= 0.5 [si	Ignition state ON AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True = True	0.5 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the message	Message is not received for time	>= 0.25 [si	Ignition state ON	= True	0.25 [s]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
			PPEI_Transmission_Otpt_Rot_Stat from TCM HS (Transmission Control Module) is received within the specified cycle time.			AND Communication related conditions fulfilled (No error passive, no undervoltage)	= True			
Controller										
ABS Valves Supply Voltage Circuit/Open	C053B	ALL	This monitoring checks if the VLV Supply line is able to drive an actuation (valve path 1).	Resistivity of valve path supply line	>3 [Ohm]	No brake pedal is pushed AND Vehicle speed	= True >9.32 [mph]	20 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the voltage is high enough for initial valve relay switch-on test.	UVR (Valve path supply voltage)	<4.6 [V]	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the voltage is high enough for initial valve relay switch-on test.	UVR (Valve path supply voltage)	<4.6 [V]	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
Antilock Brake System Active Too Long	C15D5	ALL	This monitoring checks if the ABS is correctly triggered.	ABS intervention for time	>=60[s]	Ignition state ON	= True	60 [s]	Continuous	Type A, 1 Trip
Brake Bleed Not Complete	C15C7	ALL	This monitoring checks if the IPB is in assembly mode during initialization or diagnosis.	NVM item for 'IPB Assembly Mode' is set	= True	Ignition state ON AND Once during init	= True = True	Immediately	Once	Type A, 1 Trip
Brake Booster Motor "A" Phase U-V-W Circuit Range/Performance	C0582	ALL	This monitoring checks if the two sensor voltages have plausible values.	(Sum of Temperature Sensor 1 and 2 signal line voltages OR Sum of Temperature Sensor 1 and 2 signal line voltages) AND Number of times when implausible difference is detected	>3.4 [V] <3.16 M = 5	Ignition state ON	= True	0.6 [s]	Continuous	Type A, 1 Trip
Brake System Plunger Motor Position Sensor Not Learned	C2A1C	ALL	This monitoring checks the consistency between the version of the RPS calibration data and the version in SW.	Inconsistency between RPS calibration data version and SW version	= True	IPB State	= Init phase	Immediately	Once	Type A, 1 Trip
Control Module	U3000	ALL	This monitoring checks if there is a hardware, which is not allowed to be used in series ECU.	Hardware component step ID indicates development state AND ECU TTNR (Part Number) indicates series ready ECU	= True = True	Ignition state ON AND During initialization	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the test of the charge pump has detected a failure.	Capacity of charge pump is restricted OR Performance of charge pump is insufficient OR Output voltage of charge pump is out of range	= True = True = True	Ignition state ON	= True	Immediately	Cyclic in every 19 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is DMA transfer error due to timeouts.	Transfer error occurred during DMA transfer	= True	Ignition state ON	= True	0.1 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the reference voltage of the ADC is in a proper range.	ADC reference voltage deviation is detected by comparator	= True	Ignition state ON	= True	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if MRG path is working.	(Motor Relay Actuation path is pulled low OR Hydraulic Enable is pulled low) AND MRG is switched on	= True = True = True	Ignition state ON AND Failsafe logic test is running	= True = True	0.08 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the system chip internal decouple bits are reset within the expected time.	Internal electrical and hydraulic decouple bits are not reset according to failsafe logic test	= True	Ignition state ON AND Failsafe logic test is running	= True = True	0.08 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if erroneous safety logic is detected.	Erroneous safety logic of system IC is detected	= True	Ignition state ON AND Failsafe logic test is running	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if Clockin monitor works properly (test of test).	Erroneous safety logic ofclock-in monitor is detected	= True	Ignition state ON AND Failsafe logic test is running	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the ECU electrical enable line can be switched ON by the software.	ECU electrical enable line is shorted to ground OR ECU electrical enable line cannot be switched on by the software	= True = True	Ignition state ON AND Failsafe logic test is running	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the ECU electrical enable line can be switched OFF by the software.	ECU electrical enable line is shorted to supply voltage OR ECU electrical enable line cannot be switched off by the software	= True = True	Ignition state ON AND Failsafe logic test is running	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the ECU internal hydraulic	ECU hydraulic enable line is shorted to ground	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
			enable line can be switched ON by the software.	OR ECU hydraulic enable line cannot be switched on by the software	= True	AND Failsafe logic test is running	= True			
		ALL	This monitoring checks if the ECU internal hydraulic enable line can be switched OFF by the software.	ECU hydraulic enable line is shorted to supply voltage OR ECU hydraulic enable line cannot be switched off by the software	= True = True	Ignition state ON AND Failsafe logic test is running	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the enable line is set properly.	Missing low level enable signal of ECU internal hydraulic line is detected for time OR Missing low level enable signal of ECU internal electrical line is detected for time	> 0.05 [s] >0.05 [s]	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the enable line is set properly (second ASIC).	Missing low level enable signal of ECU internal hydraulic line is detected for time OR Missing low level enable signal of ECU internal electrical line is detected for time	> 0.05 [s] >0.05 [s]	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Errorpin event counter works properly.	Error pin event counter does not increment on error pin event OR Safety logic of the ASIC is not reset properly	= True = True	Ignition state ON AND Failsafe logic test is running	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if a missing watchdog trigger causes hydraulic/electric shutdown.	Missing BIST trigger does not switch off hydraulic/electrical path	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks whether the system chip switches off the gate actuation when it detects a missing watchdog trigger.	Valve relay gate is not switched off due to missing watchdog trigger	= True	Ignition state ON AND Fail-safe logic test is running	= True = True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the valve relay gate actuation is properly switched off via a Serial Peripheral Interface (SPI) command during the Fail-Safe Logic Test.	Valve relay gate is not switched off via SPI	= True	Ignition state ON AND Failsafe logic test is running	= True = True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks the status of the watchdog at initialization state.	Watchdog status differs from the expected status	= True	Ignition state ON AND Failsafe logic test is running	= True = True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks the status of the watchdog.	Watchdog status differs from the expected status	= True	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks the status of the watchdog (second ASIC).	Watchdog status differs from the expected status	= True	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the watchdog BIST state machine can detect a wrong BIST command value.	Watchdog of ASIC is triggered by wrong BIST command value	= True	Ignition state ON AND Failsafe logic test is running	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if a switched on valve relay is reported as off (system chip internal status).	Hydraulic enable state is low OR Feedback of valve relay status is wrong	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the GTM time base which is used for e.g. WSS works properly.	Reference freguency detected by GTM OR Reference freguency detected by GTM	<3.8 [kHz] >4.2 [kHz]	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the time passed in the system timer is equal to the time elapsed in Generic Timer Module (GTM) peripheral.	Deviation between time passed in the system timer and in the GTM peripheral	> 0.005 [ms]	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if system ASIC clock input frequency deviation is detected.	ASIC clock input frequency deviation detected	= True	Ignition state ON	= True	0.08 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if system ASIC clock input frequency deviation is detected (second ASIC).	ASIC clock input frequency deviation detected	= True	Ignition state ON	= True	0.08 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the ASIC can detect the failure test frames and therefore set corresponding failure flags.	ASIC could not detect the failure frames	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the 2nd ASIC can detect the failure test frames and therefore set corresponding failure flags.	Second ASIC could not detect the failure frames	= True	Ignition state ON AND During initialization	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the internal ASIC oscillator works properly.	Erroneous ASIC oscillator frequency detected	= True	Ignition state ON	= True	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the internal 2nd ASIC oscillator works properly.	Erroneous ASIC oscillator frequency detected	= True	Ignition state ON	= True	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks the SPI communication with B6 Bridge Driver ASIC.	Wrong data is sent to ASIC OR Wrong data is received from ASIC	= True = True	Ignition state ON	= True	0.01 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				OR Defect in SPI line OR Incorrect SPI communication because of a defect in ASIC	 = True = True					
		ALL	This monitoring checks if there is short circuit between Qx pin and MRAuC pin.	MRG (Motor Relay Gate) feedback bit	= 0	Ignition state ON AND During initialization AND Valve relay is not yet switched on AND Hydraulic enable line is switched on	= True = True = True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks the SPI communication between ASIC and the microcontroller.	Wrong data is sent to ASIC OR Wrong data is received from ASIC OR Defect in SPI line OR Defect in ASIC	= True = True = True = True	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks the SPI communication between 2nd ASIC and the microcontroller.	Wrong data is sent to ASIC OR Wrong data is received from ASIC OR Defect in SPI line OR Defect in ASIC	= True = True = True = True	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks for unresolvable overcurrent events in the System ASIC.	An overcurrent occurs on a GPIO pin and the pin is not reconfigurable OR Overcurrent of GPIO pin after switching it off is still present	= True = True	Ignition state ON AND During initialization	= True = False	60 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if U5V is out of range.	U5V undervoltage bit is set OR U5V overvoltage bit is set	= True = True	Ignition state ON	= True	0.06 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks the ASIC internal test of the U5V voltage regulator.	U5V voltage regulator test failed OR (U5V voltage regulator test finished AND Time passed since the test started)	= True = False >=0.1 [si	Ignition state ON	= True	0.1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the voltage regulator configuration of the ASIC matches the software configuration.	Voltage regulator configuration of the ASIC does not match configuration in SW	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the ASIC internal current reference is out of range.	System ASIC reference current (used by monitorings and test) deviation is detected by internal comparator	= True	Ignition state ON	= True	0.06 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a voltage divider drift failure (UBRDINT voltage).	UB RD INT voltage AND Difference between UBVR and UB RD INT voltage	<6.2 M >3 [V|	Ignition state ON	= True	0.18 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks the UB6 to UBB ratio together with the UBB Voltage.	UBB voltage AND Deviation between UB6and UBB voltage	>4 [V| > 25 [%1	Ignition state ON AND Electric motor is not actuated	= True = True	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a hard undervoltage measured at UBB main supply line.	UB6 voltage AND Difference between UB6 and UB Motor voltage	<3.22 M > 1.04 M	Ignition state ON AND Electric motor is actuated AND Voltage across BMS (B6 Bridge Main Supply Switch)	= True = True = True	0.2 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the NMI mechanism is running properly.	uC safety logic detects a failure	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if tests of the safety logic of uC works as expected.	Microcontroller safety logic tests fail	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the supply voltage of the microcontroller is out of range.	uC core voltage deviation is detected by voltage monitor of microcontroller	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the valve driver configuration was successful.	Valve driver configuration data read back from ASIC does not match the written data	= True	Ignition state ON	= True	0.015 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the valve driver configuration was successful.	Valve driver configuration data read back from ASIC does not match the written data	= True	Ignition state ON	= True	0.015 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		ALL	This monitoring checks if all Watchdog commands have been scheduled.	At least one command number missing during monitoring interval	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is too many wrong watchdog trigger pattern are received by system ASIC.	System ASIC watchdog error counter detects a fixed number of wrong watchdog trigger pattern	= 4	Ignition state ON	= True	0.04 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the system ASIC watchdog error counter is stuck.	System ASIC watchdog error counter is stuck	= True	Ignition state ON	= True	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks line issues between ASIC and uC.	Output signal of the multiplexer and the corresponding wheel speed signal are not identical	= True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.1 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if System IC test does not work due to hardware malfunction.	WSS HW Test in System IC failed	= True	Ignition state ON	= True	0.015 [s]	Once	Type A, 1 Trip
Control Module Processor	P0606	ALL	This monitoring checks if a third party software access into restricted RAM area is detected.	Restricted area was tried to be accessed by DMC	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the hardware components are supported by the software.	Device ID of ASIC is in the list of supported device IDs OR Software version ID of ASIC is in the list of supported software version IDs OR Microcontroller device ID is in the list of supported device IDs OR Microcontroller software version ID is in the list of supported SW version IDs	= False = False = False = False	Ignition state ON	= True	0.03 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if there is a microcontroller exception.	A CPU exception occurred	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks that each task is activated and executed within its designated timeslot.	A task is not running within the expected timeslot	= True	Ignition state ON	= True	It depends on the cycle time of the faulty task.	Continuous	Type A, 1 Trip
		ALL	This monitoring checks the error hooks (exceptions) occurring in the Operating System.	A task was started before it has finished its previous run	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the microcontroller stack is not changed by other tasks.	Checkword at the beginning or end of stack has been overwritten	= True	Ignition state ON	= True	0.08 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if an internal interrupt based system error occurred.	Interrupt based fault occurred (e.g. too long interrupt lock)	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a task runtime overload.	Jitter limit of IO (input/output) sensitive part is not held	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is an overload situation.	Task did not finish within its cycle time	= True	Ignition state ON	= True	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if cyclically test execution of SVDT in hardware is not stopped.	Stop response from hardware does not work or the test is not stopped	= True	Silent valve driver test is running	= True	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks that the task system of the microcontroller and the one of the ASIC stay synchronized or at least get resynchronized again.	Resynchronization between task system of microcontroller and ASIC fails	= True	Ignition state ON	= True	0.06 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if cyclically test execution of SVDT in hardware is not stopped.	Stop response from hardware does not work or the test is not stopped	= True	Silent valve driver test is running	= True	20 [s]	Cyclic in every 20 is]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		ALL	This monitoring checks that the task system of the microcontroller and the one of the ASIC stay synchronized or at least get resynchronized again.	Resynchronization between task system of microcontroller and ASIC fails	= True	Ignition state ON	= True	0.06 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks for UVR leakage current due to ohmic side circuit by Valve-Coil-Resistance-Measurement (VCRM) inside the HSW.	Leakage current (UVR leakage current comparator bit is set) OR UVR goes from 0 [V] to over 1.26 [V] within time	> 0.0063 [A] >= 0.06 [s]	Ignition state ON AND Execution of the valve coil resistance measurement	= True = True	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks the valve-coil resistance measurement path by Valve-Coil-Resistance-Measurement (VCRM) inside the HSW.	Driver ASIC internal current source for valve coil resistance measurement path	> 0.04 [A] +/- 5% (required source current)	Ignition state ON AND Execution of the valve coil resistance measurement	= True = True	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is short between VR and GND.	Leakage current between valve relay and ground path (High ohmic short to ground bit in ASIC is set)	> 0.0063 [A]	Ignition state ON AND Valve relay is switched off	= True = True	0.185 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is short between VR and GND.	Leakage current between valve relay and ground path (Short to ground bit in ASIC is set)	>0.0198 [A]	Ignition state ON AND Valve relay is switched off	= True = True	0.025 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the feedback of VRG actuation is plausible.	Valve relay control bit in ASIC does not match the desired actuation state	= True	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched OFF.	Valve Relay can be switched OFF	= False	Ignition state ON	= True	0.065 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched OFF during the initial test.	Valve Relay can be switched OFF	= False	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched ON.	Valve relay cannot be switched on	= True	Ignition state ON AND Valve relay is switched on	= True = True	0.015 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched ON during the initial test.	Valve relay cannot be switched on	= True	Ignition state ON AND Valve relay is switched on	= True = True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched OFF by redundant safety switch.	Valve Relay can be switched OFF by redundant safety switch	= False	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks for UVR leakage current due to ohmic side circuit by Valve-Coil-Resistance-Measurement (VCRM) inside the HSW.	Leakage current (UVR leakage current comparator bit is set) OR UVR goes from 0 [V] to over 1.26 [V] within time	> 0.0063 [A] >= 0.06 [s]	Ignition state ON AND Execution of the valve coil resistance measurement	= True = True	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks the valve-coil resistance measurement path by Valve-Coil-Resistance-Measurement (VCRM) inside the HSW.	Driver ASIC internal current source for valve coil resistance measurement path	> 0.04 [A] +/- 5% (required source current)	Ignition state ON AND Execution of the valve coil resistance measurement	= True = True	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is short between VR and GND.	Leakage current between valve relay and ground path (High ohmic short to ground bit in ASIC is set)	> 0.0063 [A]	Ignition state ON AND Valve relay is switched off	= True = True	0.185 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is short between VR and GND.	Leakage current between valve relay and ground path (Short to ground bit in ASIC is set)	>0.0198 [A]	Ignition state ON AND Valve relay is switched off	= True = True	0.025 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the feedback of VRG actuation is plausible.	Valve relay control bit in ASIC does not match the desired actuation state	= True	Ignition state ON	= True	0.05 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched OFF.	Valve Relay can be switched OFF	= False	Ignition state ON	= True	0.065 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched OFF during the initial test.	Valve Relay can be switched OFF	= False	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched ON.	Valve relay cannot be switched on	= True	Ignition state ON AND Valve relay is switched on	= True = True	0.015 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched ON during the initial test.	Valve relay cannot be switched on	= True	Ignition state ON AND Valve relay is switched on	= True = True	1 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the Valve Relay can be switched OFF by redundant safety switch.	Valve Relay can be switched OFF by redundant safety switch	= False	Ignition state ON	= True	1 [s]	Once	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		ALL	This monitoring checks if Core 1 and Core 2 SW-BIST signatures are different.	Core 1 and Core 2 SW BIST signatures are different	= True	Ignition state ON	= True	0.01 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the task scheme is proper.	Task scheme error detected	= True	Ignition state ON	= True	0.01 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the current wheel speed sensor configuration is correct via Serial Peripheral Interface (SPI).	Mismatch between current WSS mode software configuration (stored in a register) and the hardware configuration	= True	Ignition state ON	= True	0.2 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the current wheel speed sensor configuration is correct via Serial Peripheral Interface (SPI).	Mismatch between current WSS Mode software configuration stored in a register and the hardware configuration	= True	Ignition state ON	= True	0.2 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the current wheel speed sensor configuration is correct via Serial Peripheral Interface (SPI).	Mismatch between current WSS Mode software configuration stored in a register and the hardware configuration	= True	Ignition state ON	= True	0.2 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if the current wheel speed sensor configuration is correct via Serial Peripheral Interface (SPI).	Mismatch between current WSS Mode software configuration stored in a register and the hardware configuration	= True	Ignition state ON	= True	0.2 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if ASW configuration takes too long.	ASW current states stay in initialized state	= True	Ignition state ON	= True	5[s]	Continuous	Type A, 1 Trip
Control Module Programming Error	P0602	ALL	This monitoring checks if the ECU exchange was not proper.	Mismatch between the stored and the real LIPS ID	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the IPB has not been programmed with calibration data set.	5th Byte in internal customer data from any of the 5 pieces of calibration block	= ASCII 'D'	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the configuration of the wheel speed sensor type is possible.	Wheel speed sensor type value OR Wheel speed sensor type value OR NvM access failure	>35 <0 = True	Ignition state ON AND During initialization	= True = True	Immediately	Once	Type A, 1 Trip
EBCM Overtemperature	C127E	ALL	This monitoring checks if there is an overtemperature at the external power supply line in the direction of LiPS.	Overtemperature situation detected by system ASIC at external LIPS power supply line	= True	Ignition state ON	= True	0.06 [s]	Continuous	Type A, 1 Trip
Internal Control Module A/D Processing Performance	P060B	ALL	This monitoring checks if there are general ADC errors of the operational conversion.	ADC operational conversion error detected OR ID error registered OR Operational scan group has not completed its conversion in time OR Not all operational results have been written before they are read	= True = True = True = False	Ignition state ON	= True	0.08 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there are open bonds or pins.	ADC open bond failure sampling detects failure for a cumulative number of times	>= 3	Ignition state ON	= True	0.08 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the converted internal test voltages are in a defined range.	Five-point ADC self-test detects failure for a cumulative number of times	>= 3	Ignition state ON	= True	0.07 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if ADC register bits are set to the expected values.	An ADC register bit is flipped OR An ADC register bit is stuck	= True = True	Ignition state ON	= True	0.08 [s]	Continuous	Type A, 1 Trip
Internal Control Module EEPROM Error	P062F	ALL	This monitoring checks if LiPS-related NvM item can be written.	LiPS-related NvM item can not be written	= True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the motor configuration in NvM is valid during the initial test.	Wrong configuration is read by the software from NvM OR Unsupported configuration is read by the software from NvM	= True = True	Ignition state ON	= True	0.01 [s]	Once	Type A, 1 Trip
		ALL	This monitoring checks if there are too many read/write requests.	Number of write/erase requests at NvM exceeds a defined number (in case of the total number of the configured memory blocks) AND Too much write/erase task requested in a defined timeframe	= True > 0.25 [s]	Ignition state ON	= True	0.25 [s]	Continuous	Type A, 1 Trip
Internal Control Module Keep Alive Memory (KAM) Error	P0603	ALL	This monitoring checks if HW Parameter(s) can be read from EEPROM correctly.	Reading the HW Parameters from EEPROM is not successful	= True	Ignition state ON AND ECU Startup	= True = True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the NVM item for the front	NVM item can be read	= False	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
			axle can be read or valid.	OR NVM item is valid	 = False	AND Battery voltage	 = Between 9..16 M			
		ALL	This monitoring checks if the NVM item for the rear axle can be read or valid.	NVM item can be read OR NVM item is valid	= False = False	Ignition state ON AND Battery voltage	= True = Between 9..16 M	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the Linear position sensor related NVM item can be read, or the item is valid.	LiPS-related NvM item is empty OR LiPS-related NvM item is invalid	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks the write result at the end of the EEPROM write procedure.	Invalid cell result received during read back after writing to the EEPROM	= True	Ignition state ON	= True	0.02 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the gear ratio information can be read out from the non-volatile memory.	Gear ratio information can be read out from the NVM OR Gear ratio information is correct	= False = False	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the motor size information can be read out from the non-volatile memory.	Motor Size information can be read out from the NVM OR Motor Size information is correct	= False = False	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks if the NvM items: RPS Offset, RPS Rescalling, RPS CorrAmplitudes and the RPS_Version are readable.	Offset read failure occurred OR Rescaling read failure occurred OR Correction Amplitudes read failure occurred OR Version read failure occurred OR Orthogonality read failure occurred	= True = True = True = True = True	IPB State	= Init phase	Immediately	Once	Type A, 1 Trip
Internal Control Module Memory Checksum Error	P0601	ALL	This monitoring checks proper functionality of Flash.	Uncorrectable flash ECC fault occurred OR Multiple flash ECC faults occurred OR Number of flash ECC single bit faults is too high OR Flash checksum verification failed	= True = True = True = True	Ignition state ON	= True	0.08 [s]	Continuous	Type A, 1 Trip
Internal Control Module Random Access Memory (RAM) Error	P0604	ALL	This monitoring checks if the LBIST and MBIST are working properly.	Test result bits set do no match reference register value OR Signature register values do no match reference register value	= True = True	Ignition state ON	= True	Immediately	Once	Type A, 1 Trip
		ALL	This monitoring checks proper functionality of RAM.	Coupling fault occurred between neighboring RAM cells OR RAM addressing fault occurred OR RAM ECC correctable bit transient fault occurred OR RAM ECC correctable bit permanent fault occurred OR Uncorrectable RAM ECC fault occurred	= True = True = True = True = True	Ignition state ON AND During initialization	= True = True	Immediately	Continuous	Type A, 1 Trip
System Voltage High	P0563	ALL	This monitoring checks if there is an existing overvoltage situation while other LIN failure is present.	ECU Supply voltage AND Another LIN failure has been detected	>16M = True	Cranking	= False	Immediately	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the supply voltage is too high for the actuation.	Power supply voltage	> 16.5 [V]	Actuation (apply or release) has been requested	= True	2[s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if there is an overvoltage measured at UBB supply line.	Measured UBB voltage	>16[V]	Ignition state ON	= True	0.2 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if there is an overvoltage measured at UBB supply line.	Measured UBB voltage	>20 [V]	Ignition state ON	= True	0.2 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if there is an overvoltage measured at UBB supply line.	Measured UBB voltage	>27 [V]	Ignition state ON	= True	0.2 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if there is an existing overvoltage situation and this is only a replacement failure instead of other NET failures.	Network voltage AND Another NET failure has been detected	>16M = True	Ignition state ON	= True	Immediately	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the power supply at valve path is too high.	UB_VR	> 16.5 [V]	Ignition state ON	= True	1.02 [s]	Continuous	Type B, 2 Trips
Wheel Speed Sensor Frequency	C10EE	r	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	(DMA buffer state OR	= Overflow	Ignition state ON AND	= True	0.03 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				Buffer transfer error occurred (DMA TU is receiving time stamps too frequently)) AND DMA buffer failure for specific wheel speed signal is not set (the signal which is on the output of the multiplexer channel)	= True = True	Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True			
Hydraulic Valves										
Brake Booster Performance	C0021	ALL	This monitoring checks if the pressure in plunger circuit is too low.	Target pressure AND Pressure sensor 2 value	> 60 [barl < 30 [bar]	Ignition state ON AND Braking is requested (either by driver or by external) AND BBF System state	= True = True = Full	0.3 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks with goodcheck if the pressure in plunger circuit is too low.	Target pressure AND Pressure sensor 2 value	> 60 [bar] < 30 [bar]	Ignition state ON AND Braking is requested (either by driver or by external)	= True = True	0.3 [s]	Continuous	Type A, 1 Trip
Brake Fluid	C0049	ALL	This monitoring checks if the brake fluid reservoir is empty.	Brake fluid level sensor value is set to logical value "1"	= True	Ignition state ON	= True	10 [s]	Continuous	Type A, 1 Trip
	C0676	ALL	This monitoring checks if the fluid level sensor is shorted to battery.	UADC/UZP voltage ratio	> 86 [%]	Ignition state ON	= True	1 [s]	Continuous	Type A, 1 Trip
	C0677	ALL	This monitoring checks if the fluid level sensor is shorted to ground.	UADC/UZP voltage ratio	< 16 [%]	Ignition state ON	= True	1 [s]	Continuous	Type A, 1 Trip
Brake Hydraulic Circuit "C" Leak	C05B0	ALL	This monitoring checks if there is air in the plunger. It checks the system during three situation: - during replenishment (Replenishment air detection, RAD) - during TAD (Transition to idle air Detection, TAD) - active test after power on (Fluid level indicator Plausibility aur detection, FAD).	Case 1 - RAD: Calculated volume deviation (based on Pressure sensor 2 value and plunger position) AND For time	> 2 [cm^3] >1 [si	Case 1: BBF System state AND Replenishment is active AND Pressure sensor 1 value AND Ignition state ON	 = Circuit separation OR One circuit = True > 10 [barl = True	0.02 [s]	RAD: At each slow replenishment in degraded state. TAD: At each pressure based TTI in degraded state. FAD: At least once per power cycle.	Type A, 1 Trip
				Case 2 - TAD: Calculated volume deviation (based on Pressure sensor 2 value and plunger position) AND For time	 >1.5 [cm^3] > 5 [s]	Case 2: BBF System state AND TTI (Transition to Idle) is active for the plunger AND Pressure sensor 1 value AND Ignition state ON	 = Full system OR Degraded pedal feel OR Circuit separation OR One circuit = True > 10 [barl = True			
				Case 3 - FAD: Calculated volume deviation (based on Pressure sensor 2 value and plunger position) AND	 >1.5 [cm^3]	Case 3: BBF System state AND	 = Full system OR Degraded pedal feel OR Hydraulic backup with actuators			

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				For time	> 10 [s]	Braking is requested (either by driver or by external) AND Vehicle speed AND Pressure sensor 1 value AND Ignition state ON	= False = 9.32..43.5 [mph] > 10 [bar! = True			
Brake Hydraulic Circuit Excessive Compliance - Level 2	C2A20	ALL	This monitoring checks if there is a leakage in Circuit 1.	Calculated leakage based on pressure sensor 2 value and plunger position	> 500 [mm^3/s]	BBF System state AND Braking is requested (either by driver or by external)	= Circuit separation = True	0.1 ... 0.5 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a leakage in Circuit 1.	Calculated leakage based on pressure sensor 2 value and plunger position	> 500 [mm^3/s]	BBF System state AND Braking is requested (either by driver or by external)	= Circuit separation = True	0.1 ... 0.5 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a leakage in Circuit 2.	Calculated leakage based on pressure sensor 2 value and plunger position	> 500 [mm^3/s]	BBF System state AND Braking is requested (either by driver or by external)	= Circuit separation = True	0.1 ... 0.5 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a leakage in Circuit 2.	Calculated leakage based on pressure sensor 2 value and plunger position	> 500 [mm^3/s]	BBF System state AND Braking is requested (either by driver or by external)	= Circuit separation = True	0.1 ... 0.5 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a leak in the remaining single circuit.	Calculated leakage based on pressure sensor 2 value and plunger position	> 500 [mm^3/s]	BBF System state AND Braking is requested (either by driver or by external)	= One circuit = True	0.1 ... 0.5 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is a leak in the plunger circuit.	Calculated leakage based on pressure sensor 2 value and plunger position	>2000 [mm^3/s]	BBF System state AND Braking is requested (either by driver or by external)	= Full = True	0.1 ... 0.5 [s]	Continuous	Type A, 1 Trip
Brake Master Cylinder Cut Off Valve	C05D5	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	> 20 [%]					
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] <4.8 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic request is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic request is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
Brake Pedal Feedback Pressure Solenoid Circuit	C0024	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	> 5 - 8 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] > 5 - 8 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks continuously if there is PWM	PWM failure feedback bit is set	= True	Ignition state ON	= True	0.03 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
			failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	> 20 [%] = True = True	AND Valve relay supply voltage AND Any valve test is activated	>6.9 [V] = False			
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	>6.9 (Ohm] <2.2 (Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
BSCM/EBBC Hydraulic Unit Performance	C055F	ALL	This monitoring checks if there is a leakage in the Master Cylinder.	Calculated leakage	> 200 [mm^3/s]	BBF System state AND Brake Pedal AND Pressure sensor 1 value	= Full = Applied > 3 [bar]	Immediately	Continuous	Type A, 1 Trip
		ALL	This monitoring checks for signs of an inoperable or blocked Test Separation, Circuit Separation or Plunger Separation valve.	Active System Test (component STS) detects an unexpected pressure build-up	= True	System State AND BBF System state AND Braking is requested (either by driver or by external)	= Postrun = Full OR Degraded pedal feel = False	8[s]	Once in Postrun	Type A, 1 Trip
		ALL	This monitoring checks if brake boosting capability is lost.	Calculated air volume (based on pressure sensor AC value and plunger position) AND Calculated leakage	>= 8 [cm^3] > 800 [mm^3/s]	BBF System state AND Braking is requested (either by driver or by external) AND Vehicle speed	= Full OR Degraded pedal feel = False < 156.6 [mph]	4[s]	Once immediately after start of a new Power Cycle	Type A, 1 Trip
		ALL	This monitoring checks if the pressure build capability is reduced.	Calculated air in plunger	> 5 [cm^3]	BBF System state AND Braking is requested (either by driver or by external) AND Vehicle speed	= Full OR Degraded pedal feel = False < 156.6 [mph]	4[s]	Once immediately after start of a new Power Cycle	Type A, 1 Trip
		ALL	This monitoring checks if the pressure build up during replenishment is possible.	Pressure sensor 2 value gradient AND Plunger volume	< 300 [bar] > plunger volume at start of replenishment + 1 cm^3	Ignition state ON AND Replenishment is active	= True = True	0.2 [s]	Continuous	Type A, 1 Trip
Driver Applied Pressure	C05D3	ALL	This monitoring checks if the current pressure sensor	Pressure sensor value*	> too high	Ignition state ON	= True	0.2[s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Higher Than Expected			value is too high for the current Pedal Travel Sensor value.	OR Pedal Travel Sensor value	 < too low	AND ESP or ABS intervention	 = No intervention			
		ALL	This monitoring checks if the current pressure sensor value is too high for the current Pedal Travel Sensor value.	Pressure sensor value* OR Pedal Travel Sensor value	> too high < too low	Ignition state ON AND ESP or ABS intervention	= True = No intervention	0.2 [s]	Continuous	Type A, 1 Trip
Left Front Inlet Control	C0010	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 (Ohm] <4.8 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control	= True >6.9 [V] = True	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						AND Hydraulic request is set	 = False			
Left Front Outlet Control	C0011	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True > 6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 (Ohm] <4.8 (Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic request is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic request is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Left Rear Inlet Control	CO018	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 (Ohm) <4.8 (Ohm)	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
Left Rear Outlet Control	C0019	1	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR	>4-6.5[A]	Ignition state ON AND	= True	0.03 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	> 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Any valve test is activated	= False			
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 (Ohm] <4.8 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
Right Front Inlet Control	C0014	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR	>4-6.5 [A] > 195-220 [°C]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>0.4-0.9 [V] > 32.8-39.4 M					
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	SVDT is running AND Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True = True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] <4.8 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
Right Front Outlet Control	C0015	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				Voltage at Qx (Freewheeling Lost feedback bit is set)	> 32.8-39.4 M					
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] <4.8 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
Right Rear Inlet Control	C001C	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to	Voltage at low-side in off-state (Open Load feedback bit is set)	<2-2.5 [V]	Ignition state ON	= True	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
			defective coil low side and high side paths.	OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	<0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	>6.9 [V] = True = False			
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 (Ohm) <4.8 (Ohm)	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
Right Rear Outlet Control	C001D	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A]	Ignition state ON AND Valve relay supply voltage	= True >6.9 [V]	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	>4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	AND Outside of valve control AND Hydraulic request is set	= True = False			
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 (Ohm] <4.8 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
TCS Control Channel "A" Valve 1	C0001	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control	= True >6.9 [V] = True	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	> 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]	AND Hydraulic request is set	= False			
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 (Ohm] <4.8 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic request is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic request is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
TCS Control Channel "A" Valve 2	C0002	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	> 5 - 8 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] > 5 - 8 [A] > 195-220 [°C]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	> 0.4- 0.9 [V] > 32.8-39.4 M > 20 [%]					
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	>6.9 [Ohm] <2.2 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
TCS Control Channel "B" Valve 1	C0003	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	>4-6.5 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 M	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set)	<2-2.5 [V] <0.075-0.125 [A] >4-6.5 [A] > 195-220 [°C] > 0.4- 0.9 [V]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	> 32.8-39.4 M > 20 [%]					
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	> 13.7 [Ohm] <4.8 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic reguest is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic reguest is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
TCS Control Channel "B" Valve 2	C0004	ALL	This monitoring checks continuously if the valve coil has Over Current, Over Temperature, Power Ground Lost, Free Wheeling Lost failure.	Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set)	> 5 - 8 [A] > 195-220 [°C] >0.4-0.9 [V] > 32.8-39.4 [V]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks cyclically if there is shortcut between valves during Silent Valve Driver Test due to defective coil low side and high side paths.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set) OR Current through valve coil (Over Current feedback bit is set) OR Temperature in ASIC output stage (Over Temperature feedback bit is set) OR Voltage drop between PGND at low-side driver and ECU-GND (PGND-Lost feedback bit is set) OR Voltage at Qx (Freewheeling Lost feedback bit is set) OR	<2-2.5 [V] <0.075-0.125 [A] > 5 - 8 [A] > 195-220 [°C] > 0.4- 0.9 [V] > 32.8-39.4 [V]	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set)	> 20 [%]					
		ALL	This monitoring checks continuously if there is PWM failure or HsLs-Compare failure or wrong GateQx(ONZOFF) failure.	PWM failure feedback bit is set OR Deviation of measured currents right before and right after switching point (Hs-Ls Compare feedback bit is set) OR Wrong GateQx ON feedback bit is set OR Wrong GateQx OFF feedback bit is set	= True > 20 [%] = True = True	Ignition state ON AND Valve relay supply voltage AND Any valve test is activated	= True >6.9 [V] = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks continuously if the valve-coil path has interruption.	Voltage at low-side in off-state (Open Load feedback bit is set) OR Current through valve coil (Under Current feedback bit is set)	<2-2.5 [V] < 0.075- 0.125 [A]	Ignition state ON AND Any valve test is activated	= True = False	0.03 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is deviation between the measured valve resistance and the defined valve resistance in the software.	Measured valve resistance OR Measured valve resistance	>6.9 [Ohm] <2.2 [Ohm]	Ignition state ON AND Outside of valve control AND Hydraulic request is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks if there is failure inside valve driver actuation logic and actuation monitoring unit as well as inside valve driver ADC unit.	Failure in actuation logic and actuation compare logic OR Failure in low-side ADC measurement OR Failure in high-side ADC measurement OR Failure in PWM compare unit	= True = True = True = True	Ignition state ON AND Outside of valve control AND Hydraulic request is set	= True = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
		ALL	This monitoring checks cyclically the ASIC-Valve-Driver internal output-driver actuation register.	ASIC valve driver failure crosstalk OR Bit failure in ASIC valve driver actuation registers (stuck at 0 or 1) OR Unexpected ASIC valve driver feedback (considered ASIC bits: OpenLoad, Undercurrent, GateQx (ON/OFF))	= True = True = True	Ignition state ON AND Valve relay supply voltage AND Outside of valve control AND Hydraulic request is set	= True >6.9 [V] = True = False	20 [s]	Cyclic in every 20 [s]	Type A, 1 Trip
Ignition Switch Run Crank Line										
Ignition Switch On/Start Position Circuit High	P2535	ALL	This monitoring checks if the Ignition Switch Circuit is short to Battery.	Hardwired ignition switch circuit AND Engine controller run crank terminal status from CAN	>4.5 M = Low	None	= None	2.5 [s]	Continuous	Type B, 2 Trips
Ignition Switch On/Start Position Circuit Low	P2534		This monitoring checks if the Ignition Switch Circuit is interrupted or short to GND.	Hardwired ignition switch circuit AND Engine controller run crank terminal status from CAN	<2M = High	None	= None	2.5 [s]	Continuous	Type B, 2 Trips
Iqnition/ACC										
Ignition Switch Accessory Position Circuit Low	P2537		This monitoring checks if the Ignition Switch Accessory Circuit is interrupted or short to GND.	Run Crank Wakeup line AND Accessory Line	= High < 2 rvi	None	= None	0.5 [s]	Once	Type B, 2 Trips
Wheel Speed Sensors										
Left Front Wheel Speed Sensor Circuit High	C0503	ALL	This monitoring checks if there is a short circuit of the WSS Front Left signal line to the battery.	Sensor current at the signal line	>0.05 [Al	Iqnition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND	= True = True = True	0.12 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True			
Left Front Wheel Speed Sensor Circuit Low	C0502	ALL	This monitoring checks for implausible error patterns of the signal which cannot be classified either as an electrical fault (such as supply to ground which are covered by other monitorings) or valid signal.	Current value monitoring does not detect failure AND Supply line monitoring does not detect failure AND Voltage value monitoring does not detect failure AND Signal is not valid	= True = True = True = False	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is supply line short to ground failure in case of front left WSS.	Current at sensor supply line AND Current at sensor supply line	> 0.055 [A] <0.16 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Left Front Wheel Speed Sensor Circuit/Open	C0500	ALL	This monitoring checks if there is a short to ground or interruption based on current measurement in case of WSS Front Left line.	Sensor current at the signal line	< 0.0038 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND	= True = True = True	0.12 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True			
Left Front Wheel Speed Sensor Direction (Incorrect Mounting)	C0056	ALL	This monitoring checks if the measured rotation direction of FL wheel is correct.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON AND Vehicle speed AND At least two WSS direction information is available	= True >3.13 [mph] = True	20 [s]	Continuous	Type B, 2 Trips
Left Front Wheel Speed Sensor Incorrect Component Installed	C0555	BoschVDA ContiVdaR	This monitoring checks if a wrong wheel speed sensor type is mounted.	VDA protocol bits received	<> 9	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3[s]	Continuous	Type A, 1 Trip
		DF11i	This monitoring checks if a wrong wheel speed sensor type is mounted.	Stop pulse according to WSS protocol is detected	= False	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3[s]	Continuous	Type A, 1 Trip
		DF11s	This monitoring checks if a wrong wheel speed sensor type is mounted.	Stop pulse according to WSS protocol is detected	= True	Ignition state ON AND Sensor supply voltage	= True >6M	3[s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True			
Left Front Wheel Speed Sensor Intermittent/Erratic	C0504	ALL	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer state OR Buffer transfer error occurred (DMA TU is receiving time stamps too frequently)	= Overflow = True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.03 [s]	Continuous	Type A, 1 Trip
		BoschVDA ContiVdaR	This monitoring checks if a wrong parity bit is received from WSS Front Left.	Parity information in ASIC differs from Parity information from WSS	= True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	1 [s]	Continuous	Type A, 1 Trip
Left Front Wheel Speed Sensor	C0501	BoschVDA ContiVdaR	This monitoring checks if there is an incorrect air gap between the impulse wheel and the front left sensor.	Magnetic flux density AND	< 0.0022 m	Ignition state ON AND	= True	18 [s] if Veh. Speed is 3.1	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Range/Performanee				For a number of wheel rotations	>= 5	Vehicle speed AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	>1.24 [mph] = True = True = True = True	[mph] 22 [s] if Veh. Speed is 1.24 [mph]		
		BoschVDA ContiVdaR	This monitoring checks if stop pulses are not received from front left WSS.	Speed pulses are not received (standstill condition) AND VDA standstill protocol is not received	= True = True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3.6 [s]	Continuous	Type B, 2 Trips
		DF11i	This monitoring checks if stop pulses are not received from front left WSS.	Sensor is not sending speed/stop pulses	= True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3.6 [s]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		Bosch	This monitoring checks if there is an undervoltage on the WSS Front Left Supply Line.	Case 1: ECU supply line	<9 M	Case 1: Ignition state ON AND During initialization	 = True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.15 [V]	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	 = True = True = True = True = True	0.06 [s]		
		Conti	This monitoring checks if there is an undervoltage on the WSS Front Left Supply Line.	Case 1: ECU supply line	<9.3 [V|	Case 1: Ignition state ON AND During initialization	 = True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.65 [V]	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	 = True = True = True = True = True	0.06 [s]		
		DF11s DF11i	This monitoring checks if there is an undervoltage on the WSS Front Left Supply Line.	Case 1: ECU supply line	<7.2 M	Case 1: Ignition state ON AND During initialization	 = True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.15 [V]	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND	 = True = True	0.06 [s]		

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True			
		ALL	This monitoring checks if the system can recognize a WSS FL line failure.	Hardware check failed according to the ASIC internal register data	= True	Ignition state ON	= True	0.05 [s]	Once	Type B, 2 Trips
		ALL	This monitoring checks the amount of the magnetic poles of the WSS FL tone wheel for one rotation.	A gap in the raw WSS signal is consequently detected for a defined number of times	>= 10	Ignition state ON AND Vehicle speed AND ESP or ABS intervention AND Rough road is detected	= True = 6.21..37.28 [mphl = False = False	Immediately after recognizing the 10th gap	Continuous	Type B, 2 Trips
		ALL	This monitoring checks for a discontinuous WSS Signal.	(Wheel acceleration AND For a calibrated number of counts AND For time) OR (Wheel acceleration AND Accumulation of the weighted noise amplitude in current driving cycle) OR (Number of detected increasing edges AND Within time)	> 981 [m/s^2] = 2 < 1.2 [si > 500 [m/s^21 >4 >= 3 = 0.005 [si	Ignition state ON	= True	20 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks WSS for implausibly high wheel speed value.	Measured wheel speed	> 183.95 [mph]	Ignition state ON	= True	5[s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the difference between the wheel speed sensor signals and WSS FL is within a valid range.	Case 1: IDifference between maximum and minimum wheel speedl	>3.73 [mphl	Case 1: Ignition state ON AND Vehicle speed AND Curve driving	 = True < 12.43 [mphl < 20 [deg/sl	9-18 [s]	Continuous	Type B, 2 Trips
				Case 2: IDifference between maximum and minimum wheel speed|	> 6 [%] of the vehicle speed	Case 2: Ignition state ON AND Vehicle speed AND Curve driving	 = True > 12.43 [mphl < 20 [deg/sl	9-18 [s]		
				Case 3: IDifference between maximum and minimum wheel speedl	>3.73 [mphl	Case 3: Ignition state ON AND Vehicle speed AND Curve driving	 = True <62.13 [mphl > 20 [deg/sl	9-18 [s]		
				Case 4: IDifference between maximum and minimum wheel speedl	> 6 [%] of the vehicle speed	Case 4: Ignition state ON AND Vehicle speed	 = True >= 62.13 [mphl	9-18 [s]		
				Case 5: IDifference between maximum and minimum wheel speedl	>3.73 [mphl	Case 5: (Spinning wheel is detected OR Number of defective WSS OR	 = True >2	72 [s]		

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						ABS is not available OR Number of wheel velocities below 3.1 mph) AND Ignition state ON	= True > 3 = True			
		ALL	This monitoring checks if there is a lost wheel speed sensor signal.	Case 1: (Speed of one wheel AND Vehicle speed increase) OR (Speed of two wheels AND Vehicle speed increase)	 = 0 [mph] >7.38 [mph] = 0 [mph] > 12.97 (all wheel drive) or 7.38 (two wheel drive) [mph]	Case 1: Ignition state ON AND ABS TCS EBD control AND Drive off from standstill	 = True = False = True	0.5 [s]	Continuous	Type B, 2 Trips
				Case 2: Speed of one wheel AND Vehicle speed increase	 = 0 [mph] >11.18 [mph]	Case 2: Ignition state ON AND ABS TCS EBD control	 = True = False	Immediately		
				Case 3: Wheel acceleration	 < -300 [m/s^2]	Case 3: Ignition state ON AND Vehicle speed AND Aguaplaning	 = True > 34.67 [mph] = False	0.08 [s]		
Left Rear Wheel Speed Sensor Circuit High	C050F	ALL	This monitoring checks if there is a short circuit of the WSS Rear Left signal line to the battery.	Sensor current at the signal line	>0.05 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Circuit Low	C050E	ALL	This monitoring checks for implausible error patterns of the signal which cannot be classified either as an electrical fault (such as supply to ground which are covered by other monitorings) or valid signal.	Current Value Monitoring detects failure AND Supply Line Monitoring detects failure AND Voltage Value Monitoring detects failure AND Signal is valid	= False = False = False = False	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND	= True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True			
		ALL	This monitoring checks if there is supply line short to ground failure in case of rear left WSS.	Current at sensor supply line AND Current at sensor supply line	> 0.055 [A] <0.16 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Circuit/Open	C050C	ALL	This monitoring checks if there is a short to ground or interruption based on current measurement in case of WSS Rear Left line.	Sensor current at the signal line	< 0.0038 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Direction (Incorrect Mounting)	C0058	ALL	This monitoring checks if the measured rotation direction of RL wheel is correct.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON AND Vehicle speed AND At least two WSS direction information is available	= True >3.13 [mph] = True	20 [s]	Continuous	Type B, 2 Trips
Left Rear Wheel Speed Sensor Incorrect Component Installed	C0557	BoschVDA ContiVdaR	This monitoring checks if a wrong wheel speed sensor type is mounted.	VDA protocol bits received	<> 9	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND	= True >6M = True	3[s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True			
		DF11i	This monitoring checks if a wrong wheel speed sensor type is mounted.	Stop pulse is not detected	= True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True > 6 M = True = True = True = True	3 [s]	Continuous	Type A, 1 Trip
Left Rear Wheel Speed Sensor Intermittent/Erratic	C0510	ALL	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer is in "overflow" state OR Buffer transfer error occurred	= True = True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.03 [s]	Continuous	Type A, 1 Trip
		BoschVDA ContiVdaR	This monitoring checks if a wrong parity bit is received from WSS Rear Left.	Parity information in ASIC differs from Parity information from WSS	= True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND	= True = True	1 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True			
Left Rear Wheel Speed Sensor Range/Performance	C050D	BoschVDA ContiVdaR	This monitoring checks if there is an incorrect air gap between the impulse wheel and the rear left sensor.	Magnetic flux density AND For a number of wheel rotations	< 0.0022 FT1 >= 5	Ignition state ON AND Vehicle speed AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >1.24 [mph] = True = True = True = True	8 [s] if Veh. Speed is 3.1 [mph] 22 [s] if Veh. Speed is 1.24 [mph]	Continuous	Type B, 2 Trips
		BoschVDA ContiVdaR	This monitoring checks if stop pulses are not received from rear left WSS.	Speed pulses are not received (standstill condition) AND VDA standstill protocol is not received	= True = True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6 M = True = True = True = True	3.6 [s]	Continuous	Type B, 2 Trips
		DF11i	This monitoring checks if stop pulses are not received from rear left WSS.	Sensor is not sending speed/stop pulses	= True	Ignition state ON AND Sensor supply voltage AND	= True >6 M	3.6 [s]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True			
		Bosch	This monitoring checks if there is an undervoltage on the WSS Rear Left Supply Line.	Case 1: ECU supply line	< 9 [V]	Case 1: Ignition state ON AND During initialization	= True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.15 M	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.06 [s]		
		Conti	This monitoring checks if there is an undervoltage on the WSS Rear Left Supply Line.	Case 1: ECU supply line	<9.3 [V]	Case 1: Ignition state ON AND During initialization	= True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.65 M	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND	= True = True = True = True	0.06 [s]		

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True			
		DF11s DF11l	This monitoring checks if there is an undervoltage on the WSS Rear Left Supply Line.	Case 1: ECU supply line	<7.2 M	Case 1: Ignition state ON AND During initialization	 = True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.15 [V]	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	 = True = True = True = True = True	0.06 [s]		
		ALL	This monitoring checks if the system can recognize a WSS RL line failure.	Hardware check failed according to the ASIC internal register data	= True	Ignition state ON	= True	0.05 [s]	Once	Type B, 2 Trips
		ALL	This monitoring checks the amount of the magnetic poles of the WSS RL tone wheel for one rotation.	A gap in the raw WSS signal is consequently detected for a defined number of times	>= 10	Ignition state ON AND Vehicle speed AND ESP or ABS intervention AND Rough road is detected	= True = 6.21..37.28 [mphl = False = False	Immediately after recognizing the 10th gap	Continuous	Type B, 2 Trips
		ALL	This monitoring checks for a discontinuous WSS Signal.	(Wheel acceleration AND For a calibrated number of counts AND For time) OR (Wheel acceleration AND Accumulation of the weighted noise amplitude in current driving cycle) OR (Number of detected increasing edges AND Within time)	> 981 [m/s^2] = 2 < 1.2 [si > 500 [m/s^21 >4 >= 3 = 0.005 [si	Ignition state ON	= True	20 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks WSS for implausibly high wheel speed value.	Measured wheel speed	> 183.95 [mph]	Ignition state ON	= True	5[s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the difference between the wheel speed sensor signals and WSS RL is within a valid range.	Case 1: IDifference between maximum and minimum wheel speedl	>3.73 [mphl	Case 1: Ignition state ON AND Vehicle speed AND Curve driving	 = True < 12.43 [mphl < 20 [deg/sl	9-18 [s]	Continuous	Type B, 2 Trips
				Case 2: IDifference between maximum and minimum wheel speed|	> 6 [%] of the vehicle speed	Case 2: Ignition state ON AND Vehicle speed AND	 = True > 12.43 [mphl	9-18 [s]		

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Curve driving	< 20 [deg/s]			
				Case 3: |Difference between maximum and minimum wheel speed|	>3.73 [mph]	Case 3: Ignition state ON AND Vehicle speed AND Curve driving	 = True <62.13 [mph] > 20 [deg/s]	9-18 [s]		
				Case 4: IDifference between maximum and minimum wheel speedI	> 6 [%] of the vehicle speed	Case 4: Ignition state ON AND Vehicle speed	 = True >= 62.13 [mph]	9-18 [s]		
				Case 5: IDifference between maximum and minimum wheel speed|	>3.73 [mph]	Case 5: (Spinning wheel is detected OR Number of defective WSS OR ABS is not available OR Number of wheel velocities below 3.1 mph) AND Ignition state ON	 = True > 2 = True > 3 = True	72 [s]		
		ALL	This monitoring checks if there is a lost wheel speed sensor signal.	Case 1: (Speed of one wheel AND Vehicle speed increase) OR (Speed of two wheels AND Vehicle speed increase)	 = 0 [mph] >7.38 [mph] = 0 [mph] > 12.97 (all wheel drive) or 7.38 (two wheel drive) [mph]	Case 1: Ignition state ON AND ABS TCS EBD control AND Drive off from standstill	 = True = False = True	0.5 [s]	Continuous	Type B, 2 Trips
				Case 2: Speed of one wheel AND Vehicle speed increase	 = 0 [mph] >11.18 [mph]	Case 2: Ignition state ON AND ABS TCS EBD control	 = True = False	Immediately		
				Case 3: Wheel acceleration	 < -300 [m/s^2]	Case 3: Ignition state ON AND Vehicle speed AND Aguaplaning	 = True > 34.67 [mph] = False	0.08 [s]		
Right Front Wheel Speed Sensor Circuit High	C0509	ALL	This monitoring checks if there is a short circuit of the WSS Front Right signal line to the battery.	Sensor current at the signal line	>0.05 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Circuit	C0508	r	This monitoring checks for implausible error patterns of the signal which cannot be classified either as an	Current Value Monitoring detects failure AND	= False	Ignition state ON AND	= True	0.12 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Low			electrical fault (such as supply to ground which are covered by other monitorings) or valid signal.	Supply Line Monitoring detects failure AND Voltage Value Monitoring detects failure AND Signal is valid	= False = False = False	Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True			
		ALL	This monitoring checks if there is supply line short to ground failure in case of front right WSS.	Current at sensor supply line AND Current at sensor supply line	> 0.055 [A] <0.16 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Circuit/Open	C0506	ALL	This monitoring checks if there is a short to ground or interruption based on current measurement in case of WSS Front Right line.	Sensor current at the signal line	< 0.0038 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Direction (Incorrect Mounting)	C0057	ALL	This monitoring checks if the measured rotation direction of FR wheel is correct.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON AND Vehicle speed	= True >3.13 [mph]	20 [s]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						AND At least two WSS direction information is available	= True			
Right Front Wheel Speed Sensor Incorrect Component Installed	C0556	BoschVDA ContiVdaR	This monitoring checks if a wrong wheel speed sensor type is mounted.	VDA protocol bits received	<> 9	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True > 6 M = True = True = True = True	3[s]	Continuous	Type A, 1 Trip
		DF11I	This monitoring checks if a wrong wheel speed sensor type is mounted.	Stop pulse according to WSS protocol is detected	= False	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True > 6 M = True = True = True = True	3[s]	Continuous	Type A, 1 Trip
		DF11s	This monitoring checks if a wrong wheel speed sensor type is mounted.	Stop pulse according to WSS protocol is detected	= True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND	= True > 6 M = True = True	3[s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True			
Right Front Wheel Speed Sensor Intermittent/Erratic	C050A	ALL	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer is in "overflow" state OR Buffer transfer error occurred	= True = True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.03 [s]	Continuous	Type A, 1 Trip
		BoschVDA ContiVdaR	This monitoring checks if a wrong parity bit is received from WSS Front Right.	Parity information in ASIC differs from Parity information from WSS	= True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	1 [s]	Continuous	Type A, 1 Trip
Right Front Wheel Speed Sensor Range/Performance	C0507	BoschVDA ContiVdaR	This monitoring checks if there is an incorrect air gap between the impulse wheel and the front right sensor.	Magnetic flux density AND For a number of wheel rotations	< 0.0022 FT1 >= 5	Ignition state ON AND Vehicle speed AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507)	= True >1.24 [mph] = True = True	8 [s] if Veh. Speed is 3.1 [mph] 22 [s] if Veh. Speed is 1.24 [mph]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True			
		BoschVDA ContiVdaR	This monitoring checks if stop pulses are not received from front right WSS.	Speed pulses are not received (standstill condition) AND VDA standstill protocol is not received	= True = True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3.6 [s]	Continuous	Type B, 2 Trips
		DF11i	This monitoring checks if stop pulses are not received from front right WSS.	Sensor is not sending speed/stop pulses	= True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3.6 [s]	Continuous	Type B, 2 Trips
		Bosch	This monitoring checks if there is an undervoltage on the WSS Front Right Supply Line.	Case 1: ECU supply line	<9M	Case 1: Ignition state ON AND During initialization	= True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.15 [V]	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501)	= True = True	0.06 [s]		

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True			
		Conti	This monitoring checks if there is an undervoltage on the WSS Front Right Supply Line.	Case 1: ECU supply line	<9.3 [V]	Case 1: Ignition state ON AND During initialization	= True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.65 M	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.06 [s]		
		DF11s DF11i	This monitoring checks if there is an undervoltage on the WSS Front Right Supply Line.	Case 1: ECU supply line	<7.2 [V]	Case 1: Ignition state ON AND During initialization	= True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.15 M	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.06 [s]		

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		ALL	This monitoring checks if the system can recognize a WSS FR line failure.	Hardware check failed according to the ASIC internal register data	= True	Ignition state ON	= True	0.05 [s]	Once	Type B, 2 Trips
		ALL	This monitoring checks the amount of the magnetic poles of the WSS FR tone wheel for one rotation.	A gap in the raw WSS signal is consequently detected for a defined number of times	>= 10	Ignition state ON AND Vehicle speed AND ESP or ABS intervention AND Rough road is detected	= True = 6.21..37.28 [mph] = False = False	Immediately after recognizing the 10th gap	Continuous	Type B, 2 Trips
		ALL	This monitoring checks for a discontinuous WSS Signal.	(Wheel acceleration AND For a calibrated number of counts AND For time) OR (Wheel acceleration AND Accumulation of the weighted noise amplitude in current driving cycle) OR (Number of detected increasing edges AND Within time)	> 981 [m/s^2] = 2 < 1.2 [s] > 500 [m/s^2] > 4 >= 3 = 0.005 [s]	Ignition state ON	= True	20 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks WSS for implausibly high wheel speed value.	Measured wheel speed	> 183.95 [mph]	Ignition state ON	= True	5 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the difference between the wheel speed sensor signals and WSS FR is within a valid range.	Case 1: |Difference between maximum and minimum wheel speed|	>3.73 [mph]	Case 1: Ignition state ON AND Vehicle speed AND Curve driving	= True < 12.43 [mph] < 20 [deg/s]	9-18 [s]	Continuous	Type B, 2 Trips
				Case 2: |Difference between maximum and minimum wheel speed|	> 6 [%] of the vehicle speed	Case 2: Ignition state ON AND Vehicle speed AND Curve driving	= True > 12.43 [mph] < 20 [deg/s]	9-18 [s]		
				Case 3: |Difference between maximum and minimum wheel speed|	>3.73 [mph]	Case 3: Ignition state ON AND Vehicle speed AND Curve driving	= True <62.13 [mph] > 20 [deg/s]	9-18 [s]		
				Case 4: |Difference between maximum and minimum wheel speed|	> 6 [%] of the vehicle speed	Case 4: Ignition state ON AND Vehicle speed	= True >= 62.13 [mph]	9-18 [s]		
				Case 5: |Difference between maximum and minimum wheel speed|	>3.73 [mph]	Case 5: (Spinning wheel is detected OR Number of defective WSS OR ABS is not available OR Number of wheel velocities below 3.1 mph) AND Ignition state ON	= True >2 = True >3 = True	72 [s]		
		ALL	This monitoring checks if there is a lost wheel speed sensor signal.	Case 1: (Speed of one wheel AND Vehicle speed increase) OR (Speed of two wheels AND	= 0 [mph] >7.38 [mph] = 0 [mph]	Case 1: Ignition state ON AND ABS TCS EBD control AND Drive off from standstill	= True = False = True	0.5 [s]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
				Vehicle speed increase)	> 12.97 (all wheel drive) or 7.38 (two wheel drive) [mph]					
				Case 2: Speed of one wheel AND Vehicle speed increase	 = 0 [mph] >11.18 [mph]	Case 2: Ignition state ON AND ABS TCS EBD control	 = True = False	Immediately		
				Case 3: Wheel acceleration	 < -300 [m/s^2]	Case 3: Ignition state ON AND Vehicle speed AND Aguaplaning	 = True > 34.67 [mph] = False	0.08 [s]		
Right Rear Wheel Speed Sensor Circuit High	C0515	ALL	This monitoring checks if there is a short circuit of the WSS Rear Right signal line to the battery.	Sensor current at the signal line	>0.05 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Right Rear Wheel Speed Sensor Circuit Low	C0514	ALL	This monitoring checks for implausible error patterns of the signal which cannot be classified either as an electrical fault (such as supply to ground which are covered by other monitorings) or valid signal.	Current Value Monitoring detects failure AND Supply Line Monitoring detects failure AND Voltage Value Monitoring detects failure AND Signal is valid	= False = False = False = False	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if there is supply line short to ground failure in case of rear right WSS.	Current at sensor supply line AND Current at sensor supply line	> 0.055 [A] <0.16 [A]	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507)	= True = True = True	0.12 [s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	 = True = True			
Right Rear Wheel Speed Sensor Circuit/Open	C0512	ALL	This monitoring checks if there is a short to ground or interruption based on current measurement in case of WSS Rear Right line.	Sensor current at the signal line	< 0.0038 [Al	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.12 [s]	Continuous	Type A, 1 Trip
Right Rear Wheel Speed Sensor Direction (Incorrect Mounting)	C0059	ALL	This monitoring checks if the measured rotation direction of RR wheel is correct.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON AND Vehicle speed AND At least two WSS direction information is available	= True >3.13 [mph] = True	20 [s]	Continuous	Type B, 2 Trips
Right Rear Wheel Speed Sensor Incorrect Component Installed	C0558	BoschVDA ContiVdaR	This monitoring checks if a wrong wheel speed sensor type is mounted.	VDA protocol bits received	<> 9	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3[s]	Continuous	Type A, 1 Trip
		DF11i	This monitoring checks if a wrong wheel speed sensor type is mounted.	Stop pulse is not detected	= True	Ignition state ON AND Sensor supply voltage	= True >6M	3[s]	Continuous	Type A, 1 Trip

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True			
Right Rear Wheel Speed Sensor Intermittent/Erratic	C0516	ALL	This monitoring checks if there is an overflow in the Direct Memory Access Transfer Unit.	DMA buffer is in "overflow" state OR Buffer transfer error occurred	= True = True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	0.03 [s]	Continuous	Type A, 1 Trip
		BoschVDA ContiVdaR	This monitoring checks if a wrong parity bit is received from WSS Rear Right.	Parity information in ASIC differs from Parity information from WSS	= True	Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True = True = True	1 [s]	Continuous	Type A, 1 Trip
Right Rear Wheel Speed Sensor	C0513	BoschVDA ContiVdaR	This monitoring checks if there is an incorrect air gap between the impulse wheel and the rear right sensor.	Magnetic flux density AND	< 0.0022 m	Ignition state ON AND	= True	18 [s] if Veh. Speed is 3.1	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
Range/Performanee				For a number of wheel rotations	>= 5	Vehicle speed AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	>1.24 [mph] = True = True = True = True	[mph] 22 [s] if Veh. Speed is 1.24 [mph]		
		BoschVDA ContiVdaR	This monitoring checks if stop pulses are not received from rear right WSS.	Speed pulses are not received (standstill condition) AND VDA standstill protocol is not received	= True = True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3.6 [s]	Continuous	Type B, 2 Trips
		DF11i	This monitoring checks if stop pulses are not received from rear right WSS.	Sensor is not sending speed/stop pulses	= True	Ignition state ON AND Sensor supply voltage AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True >6M = True = True = True = True	3.6 [s]	Continuous	Type B, 2 Trips

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
		Bosch	This monitoring checks if there is an undervoltage on the WSS Rear Right Supply Line.	Case 1: ECU supply line	<9 M	Case 1: Ignition state ON AND During initialization	 = True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.15 [V]	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	 = True = True = True = True = True	0.06 [s]		
		Conti	This monitoring checks if there is an undervoltage on the WSS Rear Right Supply Line.	Case 1: ECU supply line	<9.3 [V|	Case 1: Ignition state ON AND During initialization	 = True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.65 [V]	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	 = True = True = True = True = True	0.06 [s]		
		DF11s DF11i	This monitoring checks if there is an undervoltage on the WSS Rear Right Supply Line.	Case 1: ECU supply line	< 7.2 [V]	Case 1: Ignition state ON AND During initialization	 = True = True	1.2 [s]	Initial and continuous	Type B, 2 Trips
				Case 2: Supply voltage across the WSS	<5.15 M	Case 2: Ignition state ON AND Front Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0501) AND	 = True = True	0.06 [s]		

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						Front Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0507) AND Rear Left WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C050D) AND Rear Right WSS Test is finished as sensor undervoltage fault is not logged (SAE code: C0513)	= True = True = True			
		ALL	This monitoring checks if the system can recognize a WSS RR line failure.	Hardware check failed according to the ASIC internal register data	= True	Ignition state ON	= True	0.05 [s]	Once	Type B, 2 Trips
		ALL	This monitoring checks the amount of the magnetic poles of the WSS RR tone wheel for one rotation.	A gap in the raw WSS signal is consequently detected for a defined number of times	>= 10	Ignition state ON AND Vehicle speed AND ESP or ABS intervention AND Rough road is detected	= True = 6.21..37.28 [mphl = False = False	Immediately after recognizing the 10th gap	Continuous	Type B, 2 Trips
		ALL	This monitoring checks for a discontinuous WSS Signal.	(Wheel acceleration AND For a calibrated number of counts AND For time) OR (Wheel acceleration AND Accumulation of the weighted noise amplitude in current driving cycle) OR (Number of detected increasing edges AND Within time)	> 981 [m/s^2] = 2 < 1.2 [si > 500 [m/s^21 >4 >= 3 = 0.005 [si	Ignition state ON	= True	20 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks WSS for implausibly high wheel speed value.	Measured wheel speed	> 183.95 [mph]	Ignition state ON	= True	5[s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the difference between the wheel speed sensor signals and WSS RR is within a valid range.	Case 1: IDifference between maximum and minimum wheel speedl	>3.73 [mphl	Case 1: Ignition state ON AND Vehicle speed AND Curve driving	= True < 12.43 [mphl < 20 [deg/sl	9-18 [s]	Continuous	Type B, 2 Trips
				Case 2: IDifference between maximum and minimum wheel speed|	> 6 [%] of the vehicle speed	Case 2: Ignition state ON AND Vehicle speed AND Curve driving	= True > 12.43 [mphl < 20 [deg/sl	9-18 [s]		
				Case 3: IDifference between maximum and minimum wheel speedl	>3.73 [mphl	Case 3: Ignition state ON AND Vehicle speed AND Curve driving	= True <62.13 [mphl > 20 [deg/sl	9-18 [s]		
				Case 4: IDifference between maximum and minimum wheel speedl	> 6 [%] of the vehicle speed	Case 4: Ignition state ON AND Vehicle speed	= True >= 62.13 [mphl	9-18 [s]		
				Case 5: IDifference between maximum and minimum wheel speedl	>3.73 [mphl	Case 5: (Spinning wheel is detected OR Number of defective WSS OR	= True >2	72 [s]		

System/ Component	Fault Code	Variant	Monitoring Strategy Description	Malfunction Criteria	Malfunction Criteria Threshold Value	Secondary Parameters	Enable Condition	Time Required	Frequency of Checks	MIL Illumination
						ABS is not available OR Number of wheel velocities below 3.1 mph) AND Ignition state ON	= True >3 = True			
		ALL	This monitoring checks if there is a lost wheel speed sensor signal.	Case 1: (Speed of one wheel AND Vehicle speed increase) OR (Speed of two wheels AND Vehicle speed increase)	 = 0 [mph] >7.38 [mph] = 0 [mph] > 12.97 (all wheel drive) or 7.38 (two wheel drive) [mph]	Case 1: Ignition state ON AND ABS TCS EBD control AND Drive off from standstill	 = True = False = True	0.5 [s]	Continuous	Type B, 2 Trips
				Case 2: Speed of one wheel AND Vehicle speed increase	 = 0 [mph] >11.18 [mph]	Case 2: Ignition state ON AND ABS TCS EBD control	 = True = False	Immediately		
				Case 3: Wheel acceleration	 < -300 [m/s^2]	Case 3: Ignition state ON AND Vehicle speed AND Aguaplaning	 = True > 34.67 [mph] = False	0.08 [s]		
Vehicle Speed - Wheel Speed Correlation	P215A	ALL	This monitoring checks if sensor signals seem to be affected by temporary failure suspicion at the same time to ensure the proper working of ABS functionality.	Number of sensor signal monitoring fault suspicions detected	>2	Ignition state ON	= True	0.5 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if the source of the invalid signal can be found.	lDifference between maximum and minimum wheel speedl	>52.12 [mph]	Ignition state ON AND Vehicle speed	= True >3.1 [mph]	9 - 72 [s]	Continuous	Type B, 2 Trips
		ALL	This monitoring checks if sensor signals seem to be affected by temporary failure suspicion at the same time to ensure the proper working of Vehicle Dynamic Control functionality.	Number of sensor signal monitoring fault suspicions detected	> 1	Ignition state ON	= True	0.1 [s]	Continuous	Type B, 2 Trips
Wheel Speed Sensor Signal Cross Coupled	C2A23	ALL	This monitoring checks if the wheel speed sensors at the Front Axle are mounted incorrectly or if the wheel speed sensors at the Front axle are swapped.	Integrated model yaw rate out of Front Axle wheel speed sensors AND Integrated model yaw rate out of Steering Angle Sensor	< -90 [deg] > 90 [deg]	Ignition state ON AND Vehicle speed AND Curve driving	= True >4.47 [mph] > 3 [deg/s]	30 [s]	Continuous	Type A, 1 Trip
		ALL	This monitoring checks if the wheel speed sensors at the Rear Axle are mounted incorrectly or if the wheel speed sensors at the Rear axle are swapped.	Integrated model yaw rate out of Rear Axle wheel speed sensors AND Integrated model yaw rate out of Steering Angle Sensor	< -90 [deg] > 90 [deg]	Ignition state ON AND Vehicle speed AND Curve driving	= True >4.47 [mph] > 3 [deg/s]	30 [s]	Continuous	Type A, 1 Trip
Wheel Speed Sensors Rotation Direction Correlation	C003F	ALL	This monitoring checks the rotation direction of wheel speed sensors.	Rotation direction of monitored wheel differs from at least two other wheels rotation direction	= True	Ignition state ON AND Vehicle speed AND Number of WSS direction information is available	= True >3.13 [mph] >= 3	20 [s]	Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Longitudinal Acceleration Sensor Performance	C0522	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal rationalized against the TOSS vehicle speed acceleration. The diagnostic monitor can be designed to detect an invalid longitudinal acceleration signal based on the TOSS vehicle speed windows and TOSS vehicle speed acceleration, 4 windows can be enabled. The delta between the TOSS vehicle speed acceleration and longitudinal acceleration signal is taken within each window to verify the delta is small, no failure indicated, or the delta is large indicating the longitudinal acceleration signal is in error. Emission neutral default state sets lateral longitudinal acceleration signal = 0.0 g.	ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal fail time, 50 millisecond update rate update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	> 0.1500 g	battery voltage run crank voltage diagnostic monitor enable region 1 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed	> 11.00 volts > 11.00 volts = 1 Boolean = 0 Boolean > 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th > 0.5300 g < 3.8500 g < 0.70 % > 80.0 Nm > 0.1500 g > 15.0 KPH < 200.0 KPH	raw longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time> 120.0 seconds, 50 millisecond update rate region 1 fail time > 75.0 seconds out of region 1 sample time > 120.0 seconds, 50 millisecond update rate	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.
					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	> 0.1500 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	> 0.1500 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	> 0.1500 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable	> 11.00 volts > 11.00 volts = 1 Boolean = 0 Boolean > 15.0 KPH < 0.5300 g = TRUE = TRUE = TRUE	raw lateral longitudinal acceleration signal stability time > 10.0 seconds raw longitudinal acceleration signal fail time > 75.0 seconds out of sample time> 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					diagnsotic fault sequence gear active 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 % < 80.0 Nm < 0.1500 g > 0.0 KPH < 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time > 75.0 seconds out of region 4 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.
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	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.
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	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.
Lateral Acceleration Sensor Circuit Low	C124F	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to ground or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	< -3.8500 g > -3.8500 g (< 0.5 Q impedance between signal and controller ground)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time> 120.0 seconds, 50 millisecond update rate	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.
Lateral Acceleration Sensor Circuit High	C1250	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a short to power or open fault by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	raw lateral acceleration signal when sensor type is directly proportional OR raw lateral acceleration signal when sensor type is inversely proportional update raw lateral acceleration signal stability time, fail and sample time, 50 millisecond update rate	> 3.8500 g < 3.8500 g (< 0.5 Q impedance between signal and controller power)	battery voltage run crank voltage diagnostic monitor enable sensor type is either directly proportional or inversely proportional U0073 fault active U0073 test fail this key on	> 11.00 volts > 11.00 volts = 1 Boolean = CeLATR_e_VoltageDirectProp = FALSE = FALSE	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time> 120.0 seconds, 50 millisecond update rate	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.
Lateral Acceleration Sensor Performance	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds. Emission neutral default state sets lateral acceleration signal = 0.0 g.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	> 0.5300 g < 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	> 11.00 volts > 11.00 volts = 1 Boolean > 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time > 30.0 seconds, fail time > 75.0 seconds out of sample time> 120.0 seconds, 50 millisecond update rate	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.
Intake Camshaft Actuator Solenoid Circuit Open - Bank 1	P0010	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid 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 K Q impedance between signal and controller ground.	P0010is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	20 failures out of 25 samples 250 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.
Intake Camshaft System Performance - Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when WT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Intake cam Bank 1) Cam Position Error > (**P0011_CamPosErrorLimId**)deg	**Intake Cam Phsr Enable**	= TRUE	135.00 failures out of 150.00 samples 100 ms /sample	Type A, 1 Trips
					System Voltage	> 11.00 Volts		
					Engine Running	= TRUE		
					Power Take Off (PTO) active	= FALSE		
					Desired cam position	> 0 deg		
					Desired AND Measured cam position	> (**P0011_CamPosErrorLimIc1**)deg AND < **(CalculatedPerfMaxId)** deg		
					Desired cam position variation	< 3.00 deg for (**P0011_P05CC_StablePositionTimeId**) seconds		
					No Active DTCs	P0010 P2088 P2089		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Actuator Solenoid Circuit Open - Bank 1	P0013	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid 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 K Q impedance between signal and controller ground.	P0013is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	20 failures out of 25 samples 250 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.
Exhaust Camshaft System Performance - Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when WT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Exhaust cam Bank 1) Cam Position Error > (**P0014_CamPosErrorLimEd**) deg	**Exhaust Cam Phsr Enable**	= TRUE	135.00 failures out of 150.00 samples 100 ms /sample	Type A, 1 Trips
					System Voltage	> 11.00 Volts		
					Engine Running	= TRUE		
					Power Take Off (PTO) active	= FALSE		
					Desired cam position	> 0 deg		
					Desired AND Measured cam position	> (**P0014_CamPosErrorLimEc1**) deg AND < **(CalculatedPerfMaxEd)** deg		
					Desired cam position variation	<3.00 deg for (**P0014_P05CE_StablePositionTimeEd**) seconds		
					No Active DTCs	P0013 P2090 P2091		

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 SensorA	P0016	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	Out of range cam edge measurements in one engine cycle Out of range values are: cam edge measurement OR cam edge measurement from the expeced nominal cam position	>= 4 cam edges < -8.5 Crank Degrees > 12.4 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phaser is 'parked' No Active DTCs: Time since last execution of a test IntCamECCjDilPresLow	Test is Enabled CrankSensor_FA P0340, P0341 > 1.0 sec = FALSE	4 cam edge measurements and 1 test sample per engine cycle Test failure is 4 fails in 5 samples Diagnostic failure is 2 failed tests out of 3 If the first test fails, the next test is delayed to confirm the phaser 'parked' This delay time is defined by **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold** For mid-park phasers, an additional delay **P0016-0019 Mid-Park Phaser Delay** is applied	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	Out of range cam edge measurements in one engine cycle Out of range values are: cam edge measurement OR cam edge measurement from the expeced nominal cam position	>= 4 cam edges < -8.5 Crank Degrees > 12.4 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser control indcates the phaser is 'parked' No Active DTCs: Time since last execution of a test ExhCamECC_OilPresLow	Test is Enabled CrankSensor_FA P0365, P0366 > 1.0 sec = FALSE	4 cam edge measurements and 1 test sample per engine cycle Test failure is 4 fails in 5 samples Diagnostic failure is 2 failed tests out of 3 If the first test fails, the next test is delayed to confirm the phaser 'parked' This delay time is defined by **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold** For mid-park phasers, an additional delay **P0016-0019 Mid-Park Phaser Delay** is applied	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 1 Control Circuit Open	P001A	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 1 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 K Ω impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 1 Control Circuit Low Voltage	P001B	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 1 solenoid 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 Ω impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	>11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 1 Control Circuit High Voltage	P001C	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 1 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 Q impedance between signal and controller power	Diagnositc is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 1 Circuit Open	P002A	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 1 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 1 Circuit Low Voltage	P002B	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 1 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 1 Circuit High Voltage	P002C	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 1 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0031 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensori	P0031	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0030 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensori	P0032	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between output and controller power.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 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.
Turbo/Super Charger Bypass Valve A Control Circuit	P0033	Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' low sided driver for an open circuit failure, when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Ω impedance between output and controller ground	Diagnostic enabled ****************************** Powertrain relay voltage ****************************** Engine does not crank Diagnostic system not disabled	True ****************************** >=11.0 Volts ******************************	10 failures out of 12 samples PWM CRV: 100ms /sample eCRV: 12.5ms /sample	Type A, 1 Trips Note: In certain controllers P0034 may also set turbo/ super charger bypass valve control circuit low

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbo/Super Charger Bypass Valve A Control Circuit Low	P0034	Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' 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. In series application, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	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. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	< 0.5 Q impedance between output and controller ground	Diagnostic Enabled ***************************** Powertrain relay voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts *****************************	10 failures out of 12 samples PWM CRV: 100ms /sample eCRV: 12.5ms /sample	Type A, 1 Trips Note: In certain controllers P0033 may also set turbo/ super charger bypass balve control circuit

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbo/Super Charger Bypass Valve A Control Circuit High	P0035	Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' 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. In series application, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	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. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	< 0.5 Ω impedance between output and controller power.	Diagnostic enabled Powertrain relay voltage Engine does not crank Diagnostic system not disabled	True >=11.0 Volts	10 failures out of 12 samples PWM CRV: 100ms /sample eCRV: 12.5ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0037 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensor2	P0037	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedance between output and controller ground.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0036 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Control Circuit Bankl Sensor2	P0038	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedance between output and controller power.	Diagnostic is Enabled Ignition Voltage Engine Speed	 = Crank or Run >11.0 volts > 400 RPM	20 failures out of 25 samples 250 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.
Intake Camshaft Profile Actuator 1 Performance	P003C	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 1	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 1 Pin Stuck	P003D	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 1 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00) If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00, but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
HO2S Heater Resistance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	4.2 < ohms <8.2	Diagnostic is Enabled No Active DTC's Coolant - IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	 ECT_Sensor_FA P262B IAT_SensorFA < 8.0 °C >28,800 seconds > -30.0 °C < 32.0 volts < 0.09 seconds	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.
Exhaust Camshaft Profile Actuator 1 Performance	P005A	An unintended pin firing without controller command. Exhaust Camshaft Profile Actuator 1	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnositc is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables: **P0068_Delta MAP Threshold f(TPS)** Table, f(TPS). See supporting tables: **P0068_Delta MAF Threshold f(TPS)** Table, f(RPM). See supporting tables: **P0068_Maximum MAF f(RPM)** Table, f(Volts). See supporting tables: **P0068_Maximum MAF f(Volts)**	Engine Speed Run/Crank voltage	> 800 RPM > 6.41 Volts	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous 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.
Outside Air Temperature (OAT) Sensor Circuit Performance	P0071	Detects an Outside Air Temperature (OAT) sensorthat is stuck in range. There are two components to the test: an engine off component, and an engine running component.	**Engine Off:**		Diagnostic is Enabled		Executed every 100 msec until a pass or fail decision is made	Type B, 2 Trips
			If IAT >= OAT: IAT - OAT	> 15.0 deg C	Time between current ignition cycle and the last time the engine was running	>= 28,800.0 seconds		
			If IAT < OAT: OAT - IAT	> 15.0 deg C	Engine is not running			
		If the engine has been off for a long enough period of time, and the coolant temperature and Intake Air Temperature (IAT) values are similar, then the air temperature values in the engine compartment of the vehicle are considered to have equalized. In this case, the engine off component of the diagnostic can be enabled.	If either of the following conditions are met, this diagnostic will pass:		Vehicle Speed	>= 15.5 MPH		
			If IAT >= OAT: IAT - OAT	<= 15.0 deg C	Coolant Temperature - IAT	< 15.0 deg C		
			If IAT < OAT: OAT - IAT	<= 15.0 deg C	IAT - Coolant Temperature	< 15.0 deg C		
		If the IAT and the OAT values are similar, then the OAT Performance Diagnostic passes. If the IAT and OAT values are not similar, the diagnostic will continue to monitor the IAT and the OAT as the vehicle starts to move.			OAT-to-IAT engine off equilibrium counter	>= 300.0 counts		
					The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off**			
		For applications that have ability to move without engaging the internal combustion			No Active DTCs:	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		engine, the engine off test will continue. If the vehicle has been moving quickly enough for a long enough period of time, the IAT and OAT values should have reached an equilibrium. This period of time is defined by the "OAT-to-IAT engine off equilibrium counter". The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.				EngineModeNotRunTimer Error		
			Engine Running: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	> 15.0 deg C > 15.0 deg C <= 15.0 deg C <= 15.0 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine airflow OAT-to-IAT engine running equilibrium counter The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Running** No Active DTCs:	>= 28,800.0 seconds >= 15.5 MPH >= 10.0 grams/second >= 300.0 counts VehicleSpeedSensor_FA	Executed every 100 msec until a pass or fail decision is made	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit Low	P0072	Detects a continuous short to ground in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too low. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw OAT Input	<= 46 Ohms (-150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Circuit High	P0073	Detects a continuous open circuit in the Outside Air Temperature (OAT) signal circuit by monitoring the OAT sensor output resistance and failing the diagnostic when the OAT resistance is too high. The OAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw OAT Input	>= 427,757 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	Detects a noisy or erratic signal in the OAT circuit by monitoring the OAT sensor and failing the diagnostic when the OAT signal has a noisier output than is expected. When the value of the OAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of OAT readings. The result of this summation is called a “string length”. Since the OAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic OAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)	> 100 deg C 10 consecutive OAT readings	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type 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 SIDI High Pressure Pump min/ max authority	P0089	This DTC determines when the high pressure pump control has reached to its max or min authority	High Pressure Fuel Pump Delivery Angle OR High Pressure Fuel Pump Delivery Angle	>= 92° <= 0°	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 132	Windup High/ Low 10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Pressure Pump Control Solenoid Enable Low Side Open Circuit	P0090	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >=11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
High Pressure Pump Control Solenoid Enable Low Side Short to Ground	P0091	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 0.1 Amps between signal and controller ground	Engine Speed Battery Voltage	>=50 RPM >=11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
High Pressure Pump Cntrl Solenoid Enable Low Side Short to Power	P0092	Controller specific output driver circuit diagnoses diagnoses High Pressure pump Control Solenoid 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.	<= 1.1 or 15 Amps selectable thershold based on High pressure Pump .	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P0096	Detects an Intake Air Temperature 2 (IAT2) sensor value that is stuck in range by comparing the IAT2 sensor value against the IAT and IAT3 sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT3 values are similar, and the IAT2 value is not similar to the IAT and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT2 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**<u>Good Correlation Between IAT and IAT3:</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	 > 30 deg C <= 25 deg C > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	 > 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT in middle:</u> Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT2) > ABS(Power Up IAT - Power Up IAT3)	 > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	 > 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ignition cycle if the enable conditions are met.	**<u>Not Good Correlation, IAT3 in middle:</u>** Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	 > 30 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	 > 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 2 Intermittent In-Range (applications with humidity)	P0099	Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected. When the value of the IAT2 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT2 readings. The result of this summation is called a “string length”. Since the IAT2 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT2 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT2 reading - IAT 2 reading from 100 milliseconds previous)	> 100.00 deg C 10 consecutive IAT 2 readings	Diagnostic is Enabled Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Radiator Coolant Temperature Sensor Performance (ATM)	P00B2	This DTC detects either a biased high or low RCT (Radiator Coolant Temperature) sensor. This is done by comparing the RCT sensor output to two other temperature sensor outputs after a soak condition.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadiatorCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6		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_EGR_UpStrmSnsr -	 OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_RadiatorOutlet_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	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.
			The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number.		BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors	EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible		
			Bypass Inlet: CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh		================== The following thresholds are based on the sensor under diagnosis **Bypass Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:**	 > 28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C		
			Threshold A:	20.00 °C	Propulsion Off Soak Time	>28,800 seconds		
			Threshold B:	10.00 °C	Ambient Air Temperature	>-20.0 °C		
			Engine Block: CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCylHdClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngOilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth		**Head Coolant:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Radiator Outlet:** Propulsion Off Soak Time	 >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-9.0 °C >28,800 seconds		
			Threshold A:	30.00 °C	Ambient Air Temperature	>-20.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRadOutClntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Head Coolant:** CeEECR_e_PhysSnsr6 Comparison sensor 1: CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngOilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkBypInClntSnsr	10.00 °C 25.00 °C 17.00 °C 20.00 °C 10.00 °C	================= Comparison sensor 1 & 2 are not ================= Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this	= CeEECR_e_BiasChkNoSelection Same set as listed above and EngineModeNotRunTimerError EngineModeNotRunTimer_FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrBlockClntSnsr CeAEHR_e_BlkHtrRadOutClntSnsr >10.00 °C > 0 seconds >28,800 seconds >-9.00 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Comparison sensor 2:		application:			
			CeEECR_e_BiasChkMa					
			nfldAirSnsr		2x2 signature	Enabled		
			Fuel Operated heater:		Absolute Drop	Enabled		
			CeEECR_e_AuxHeaterN		IAT Drop	Disabled		
			oEffect		Temperature Derivative	Disabled		
			Block Heater:					
			CeEECR_e_AuxHeaterBi		**2x2 Signature Criteria:**			
			asHigh	15.00 °C				
			Threshold A:	10.00 °C	The warm sensors			
			Threshold B:					
					Sensor 1:	CeAEHR_e_BlkHtrCylHd		
			Heater Outlet:			ClntSnsr		
			CeEECR_e_NoPhysAss		Sensor 2:	CeAEHR_e_BlkHtrEngIn		
			gnmnt			ClntSnsr		
			Comparison sensor 1:					
			CeEECR_e_BiasChkEng		The cool sensors			
			OilSnsr					
			Comparison sensor 2:		Sensor 1:	CeAEHR_e_BlkHtrRadO		
			CeEECR_e_BiasChkMa			utClntSnsr		
			nfldAirSnsr		Sensor 2:	CeAEHR_e_BlkHtrOutsid		
			Fuel Operated heater:			eAirSnsr		
			CeEECR_e_AuxHeaterN					
			oEffect		A block heater will be			
			Block Heater:		detected if the warm			
			CeEECR_e_AuxHeaterBi	25.00 °C	sensors are within	10.0 °C		
			asBoth	17.00 °C	AND			
			Threshold A:		The cool sensors are			
			Threshold B:		within	10.0 °C		
					AND			
			Radiator Outlet:		The delta between the			
			CeEECR_e_PhysSnsr3		two groups (warm/cold)	>10.0 °C		
			Comparison sensor 1:					
			CeEECR_e_BiasChkEng		**Absolute Drop Criteria:**			
			InClntSnsr					
			Comparison sensor 2:		The	CeAEHR_e_BlkHtrBlock		
			CeEECR_e_BiasChkMa		is monitored for a drop.	ClntSnsr		
			nfldAirSnsr					
			Fuel Operated heater:		The drop will be			
			CeEECR_e_AuxHeaterN		monitored for once			
			oEffect		coolant flow is	>9.00 L/min		
			Block Heater:		AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B: A failure will be reported if any of the following conditions are met. Evaluated in order: 1) This sensor is above both comparison sensors 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	30.00 °C 17.00 °C >A °C >A °C >B °C >B °C	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 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	0.0 - 60.0 seconds < 120.0 seconds >300.0 seconds >5.0 °C CeAEHR_e_BlkHtrIntakeAirSnsr >5.0 °C >400.0 seconds >24.0kph 0.5 times the seconds with vehicle speed below the threshold above > 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrBlockClntSnsr		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	Circuit Continuity This DTC detects a short to ground in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. This is accomplished by monitoring the resitance of the circuit. If the resistance goes out of the expected range the DTC is set.	RCT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	< X Ohms X is equal to: Temp Sensor 1: 55 Ohms Temp Sensor 2: 55.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 55.0 Ohms Temp Sensor 5: 41.1 Ohms Temp Sensor 6: 55.0 Ohms Temp Sensor 7: 55.0 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	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	> X Ohms X is equal to: Temp Sensor 1: 174,069 Ohms Temp Sensor 2: 174,069 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 174,069 Ohms Temp Sensor 5: 354,667 Ohms Temp Sensor 6: 174,069 Ohms Temp Sensor 7: 174,069 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	P00B5	Circuit Erratic This DTC detects large step changes in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_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 6: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6 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 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 10.0 seconds -60.0 °C 150.0 °C 10.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 7.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 5.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
High Pressure Start Diagnostic	P00C6	The DTC Diagnoses the high side fuel pressure during engine cranking.	The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking Pressure Rise Test: Sensed High Pressure Fuel Rail Pressure value Pressure Fall Test: Sensed High Pressure Fuel Rail Pressure value	< **P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery** (see Supporting Table) <= **P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start** (see Supporting Table)	High Pressure Rise Diagnostic During Start High Pressure Fall Diagnostic During Start Low side feed fuel pressure Engine Run Time Run/Crank Voltage Engine Coolant For each engine start, only 1 diagnostic is performed. The pressure rise test will run if High side fuel pressure is less than KtFHPC_p_HighPressStart, otherwise, the pressure fall diagnostic will run The pressure fall runs when the engine is cranking.	Enabled Disabled >= 0 KPA < = 0 sec > 8 Volts -100 <= °C <= 132 All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2 and ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control	Pressure Rise Test: Crank Time >= **P00C6 - High Pressure Pump Control Mode timeout** (see Supporting Table) 6.25 ms per sample Pressure Fall Test: Injected cylinder events >= **P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start** (see Supporting Table) 4 samples per engine rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					           Barometric Pressure Inlet Air Temp	commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active >= 70.0 KPA >= -20.0 DegC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Pressure Measurement System - Multiple Sensor Correlation (single turbo)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The Manifold Pressure (MAP), Turbocharger Boost Pressure and Barometric Pressure (BARO) sensors values are checked to see if they are within the normal expected atmospheric pressure range. If one of the sensors is outside the normal expected atmospheric pressure range, this monitor will fail. Otherwise, MAP, Turbocharger Boost Pressure and BARO are compared to see if their values are similar. If two of these three sensors have similar values, but the third does not, then this monitor will fail. This monitor will also fail if there is no combination	ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	> 10.0 kPa <= 10.0 kPa <= 10.0 kPa <= 10.0 kPa > 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 Turbocharger Boost Pressure Turbocharger Boost Pressure No Active DTCs: No Pending DTCs: Diagnostic is Enabled LIN communications established with MAF	> 5.0 seconds >= 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 AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		of two of these three sensors reporting similar values and the failed sensor cannot be uniquely identified.	AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa				
			Manifold Pressure OR Manifold Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	< 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: Diagnostic is Enabled LIN communications established with MAF	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	
			Turbocharger Boost Pressure OR Turbocharger Boost Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure)	< 50.0 kPa > 115.0 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:	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	

■AWS----------------------------

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa	No Pending DTCs: Diagnostic is Enabled LIN communications established with MAF	MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP		
			Barometric Pressure OR Barometric Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	< 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: Diagnostic is Enabled LIN communications established with MAF	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to ground	P00C9	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid 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.	 <= 1.1 or 15 Amps selectable thershold based on High pressure Pump.	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to power	POOCA	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid 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.	<= 0.1 Amps between signal and controller power	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
Intake Air Temperature Sensor 3 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P00E9	Detects an Intake Air Temperature 3 (IAT3) sensor value that is stuck in range by comparing the IAT3 sensor value against the IAT and IAT2 sensor values and failing the diagnostic if the IAT3 value is more different than the IAT and IAT2 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT2 values are similar, and the IAT3 value is not similar to the IAT and IAT2 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT3 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per ignition cycle if the	**<u>Good Correlation Between IAT and IAT2:</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	 <= 30 deg C > 25 deg C > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time (Engine Coolant Temp - Outside Ambient Temp) No Active DTCs: LIN communications established with MAF	 > 28,800 seconds >= 11.0 Volts >= 0.9 seconds <= 99.0 deg C PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT in Middle:</u> Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)	 > 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	 > 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 3 Low (applications with manifold temperature and humidity)	POOEA	Detects a continuous short to ground in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too low. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT 3 Input	< 57.94 Ohms (-150 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit 3 High (applications with manifold temperature and humidity)	POOEB	Detects a continuous open circuit in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too high. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT 3 Input	> 153,665 Ohms (~-60 deg C)	Diagnostic is Enabled		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor 3 Intermittent In-Range	POOEC	Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected. When the value of the IAT3 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT3 readings. The result of this summation is called a “string length”. Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Dir calculated over And where: "Dir =ABS(current IAT3 reading - IAT 3 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 3 readings	Diagnostic is Enabled		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow System Performance (single turbo)	P0101	Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor, Turbocharger Boost Pressure sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAF sensor. In this case, the MAF Performance diagnostic	See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND	> 20.0 grams/sec > 25.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 250 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Powertrain Relay Voltage for a period of time Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) -20 Deg C <= 100 Deg C >= 9.1 Volts >= 0.2 Seconds >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		will fail.	Measured TIAP - measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow -	> 30.0 kPa > 30.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm/sec as a function of engine speed. See table	No Active DTCs:	**P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow	No Pending DTCs:	AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed. See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP**	Diagnostic is Enabled			
			AND Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed. See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow**				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed. See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP**				
			AND Mass Air Flow - Filtered Mass Air Flow	< 3.0 gm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Mass Air Flow Sensor Circuit Low Frequency (all MAF suppliers except for Continental)	P0102	Detects a continuous short to ground in the MAF sensor circuit or a MAF sensor that is outputting a frequency that is too low. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too low. A low MAF frequency is associated with a low engine air flow. The MAF sensor monitors the temperature of a circuit in the airflow of the engine. The temperature of this circuit is related to the mass airflow across the sensor. The mass air flow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.	MAF Output	<= 750 Hertz (<= 0.00 gm/sec)	Engine Run Time Engine Speed Powertrain Relay Voltage Above criteria present for a period of time Diagnostic is Enabled	> 0.0 seconds >= 300 RPM >= 9.1 Volts >= 0.5 seconds	200 failures out of 250 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.
Mass Air Flow Sensor Circuit High Frequency (all MAF suppliers except for Continental)	P0103	Detects a MAF sensor that is outputting a frequency signal that is too high. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too high. A high MAF frequency is associated with a high engine air flow. The MAF sensor monitors the temperature of a circuit in the airflow of the engine. The temperature of this circuit is related to the mass airflow across the sensor. The mass air flow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.	MAF Output	>= 13,350 Hertz (>= 459.0 gm/sec)	Engine Run Time Engine Speed Powertrain Relay Voltage Above criteria present for a period of time Diagnostic is Enabled	> 0.0 seconds >= 300 RPM >= 9.1 Volts >= 0.5 seconds	200 failures out of 250 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.
Manifold Absolute Pressure Sensor Performance (single turbo)	P0106	Detects a performance failure in the Manifold Pressure (MAP) sensor, such as when a MAP value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Turbocharger Boost Pressure sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAP sensor. In this case, the MAP Performance diagnostic	<u>**Engine Running:**</u> See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAPI model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is	> 20.0 grams/sec > 25.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 250 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Powertrain Relay Voltage for a period of time Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) -20 Deg C <= 100 Deg C >= 9.1 Volts >= 0.2 Seconds >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		will fail.	TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow	> 30.0 kPa > 30.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm/sec as a function of engine speed See table	No Active DTCs:	**P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTemoSensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			-	**P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow**	No Pending DTCs:	TC_BoostPresSnsrCktFA AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP**	Diagnostic is Enabled			
			AND Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow**				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP**				
			AND Mass Air Flow - Filtered Mass Air Flow	< 3.0 gm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to ground in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 7.5 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type 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 Sensor Circuit High	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 85.8% of 5 Volt Range (This is equal to 371.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Air Temperature Sensor Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P0111	Detects an Intake Air Temperature (IAT) sensor value that is stuck in range by comparing the IAT sensor value against the IAT2 and IAT3 sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT2 and IAT3 values are similar, and the IAT value is not similar to the IAT2 and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**<u>Good Correlation Between IAT2 and IAT3</u>** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 30 deg C > 25 deg C <= 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			<u>Not Good Correlation, IAT2 in Middle:</u> Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ignition cycle if the enable conditions are met.	**Not Good Correlation, IAT3 in Middle:** Power Up IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 30 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs: LIN communications established with MAF	> 28,800 seconds >=11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor Performance (ATM)	P0116	This DTC detects either a biased high or low ECT (Engine Coolant temperature) sensor. This is done by comparing the ECT sensor output to two other temperature sensor outputs after a soak condition.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6		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_EGR_UpStrmSn	OAT_PtEstFiltFA PSAR_PropSysInactveCr s_FA = FALSE EECR_EngineOutlet_Ckt FA EECR_CylHeadCoolant_ CktFA EECR_BlockCoolant_Ckt FA EECR_EngineInlet_CktFA EECR_EngineOutlet_Ckt FA EECR_HeaterCoreInlet_C ktFA EECR_HeaterCoreOutlet _CktFA EECR_RadiatorOutlet_Ck tFA EECR_BypassInlet_CktF A EECR_CylHeadMetal1_C ktFA 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.
			The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the physical (Temperature) sensor number. **Bypass Inlet:** CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Engine Block:** CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCylHdClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngOilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B:	20.00 °C 10.00 °C	sr - BiasChk_EGR_DwnStmSnsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors ================= The following thresholds are based on the sensor under diagnosis **Bypass Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Coolant:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature	EGRTempSensorllPSS_FA EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible > 28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-9.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				30.00 °C	**Radiator Outlet:**			
			Engine Inlet: CeEECR_e_PhysSnsr1	10.00 °C	Propulsion Off Soak Time Ambient Air Temperature	>28,800 seconds >-20.0 °C		
			Comparison sensor 1: CeEECR_e_BiasChkRad OutClntSnsr		=================			
			Comparison sensor 2: CeEECR_e_BiasChkMa nfldAirSnsr		Comparison sensor 1 & 2 are not	= CeEECR_e_BiasChkNoS election		
			Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect		================= Aux Heat Detection			
			Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B:		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		
			Head Coolant: CeEECR_e_PhysSnsr6	25.00 °C 17.00 °C				
			Comparison sensor 1: CeEECR_e_BiasChkBlo ckClntSnsr					
			Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr					
			Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect		At power-up a warm sensor and cool sensor are compared			
			Block Heater: CeEECR_e_AuxHeaterBi asBoth		Warm sensor Cool sensor	CeAEHR_e_BlkHtrBlock ClntSnsr CeAEHR_e_BlkHtrRadO utClntSnsr		
			Threshold A: Threshold B:					
			Heater Inlet:		If the warm sensor is compared to the cool sensor	>10.00 °C		
			CeEECR_e_NoPhysAss gnmnt	20.00 °C 10.00 °C				
			Comparison sensor 1: CeEECR_e_BiasChkByp InClntSnsr Comoarison sensor 2:		Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature	> 0 seconds >28,800 seconds >-9.00 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInClntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater:	15.00 °C 10.00 °C 25.00 °C 17.00 °C	There are 4 different types of aux heater detection for this application: 2x2 signature Absolute Drop IAT Drop Temperature Derivative **2x2 Signature Criteria:** The warm sensors Sensor 1: Sensor 2: The cool sensors Sensor 1: Sensor 2: A block heater will be detected if the warm sensors are within AND The cool sensors are within AND The delta between the two groups (warm/cold) **Absolute Drop Criteria:** The is monitored for a drop. The drop will be monitored for once coolant flow is	Enabled Enabled Disabled Disabled CeAEHR_e_BlkHtrCylHdClntSnsr CeAEHR_e_BlkHtrEngInClntSnsr CeAEHR_e_BlkHtrRadOutClntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr 10.0 °C 10.0 °C >10.0 °C CeAEHR_e_BlkHtrBlockClntSnsr >9.00 L/min		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B: A failure will be reported if any of the following conditions are met. Evaluated in order: 1) This sensor is above both comparison sensors 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	 30.00 °C 17.00 °C >A°C >A°C >B°C >B°C	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 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	 0.0 -60.0 seconds < 120.0 seconds >300.0 seconds >5.0 °C CeAEHR_e_BlkHtrIntakeAirSnsr >5.0 °C >400.0 seconds >24.0kph 0.5 times the seconds with vehicle speed below the threshold above > 180.0 seconds > 1,800 seconds CeAEHR_e_BlkHtrBlockClntSnsr		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity This DTC detects a short to ground in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	< X Ohms X is equal to: Temp Sensor 1: 55 Ohms Temp Sensor 2: 55.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 55.0 Ohms Temp Sensor 5: 41.1 Ohms Temp Sensor 6: 55.0 Ohms Temp Sensor 7: 55.0 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	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	> X Ohms X is equal to: Temp Sensor 1: 174,069 Ohms Temp Sensor 2: 174,069 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 174,069 Ohms Temp Sensor 5: 354,667 Ohms Temp Sensor 6: 174,069 Ohms Temp Sensor 7: 174,069 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	P0119	Circuit Erratic This DTC detects large step changes in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsrl Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 7:		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.
			CeEECR_e_EngCoolantTempSnsr6 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 6: 1) Sensor time constant	 10.0 seconds -60.0 °C 150.0 °C 10.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 7.0 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			2) Sensor low limit 3) Sensor high limit Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. ****************************	-60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Position Sensor Performance (single turbo)	P0121	Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor, Turbocharger Boost Pressure sensor and Mass Air Flow (MAF) sensor. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the TPS sensor. In this case, the TPS	See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP -	> 20.0 grams/sec > 25.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 250 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Powertrain Relay Voltage for a period of time Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) -20 Deg C <= 100 Deg C >= 9.1 Volts >= 0.2 Seconds >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Performance diagnostic will fail.	measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow AND	> 30.0 kPa > 30.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow**	No Active DTCs:	**P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Manifold Pressure AND Filtered Mass Air Flow - Mass Air Flow Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	> a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP** < 3.0 gm/sec < a threshold in gm sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow** < a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP** < 3.0 gm/sec	No Pending DTCs: Diagnostic is Enabled	AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short low or open in TPS1 circuit by monitoring the TPS 1 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough.	TPS1 % 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 P06A3	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TPS1 Circuit High	P0123	Detects a continuous or intermittent short high in TPS1 circuit by monitoring the TPS 1 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too high. This diagnostic only runs when battery voltage is high enough.	TPS1 % 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	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the ECT (EngineCoolant temperature) does not achieve the required target temperature after an allowed energy accumulation by the engine. This can be caused by an ECT sensor biased low or a cooling system that is not warming up correctly because of a stuck open thermostat or other fault.	Energy is accumulated after the first conbustion event using Range 1, 2 or 3: If the maxium energy is greater than as shown in the supporting tables prior to the Engine outlet coolant achieving the target a fault will be indicated. **Range 1 (Primary):** Ambient air temperature is between 10.0 and 52.0 °C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 22.0 °C. The target temperature for this range will not drop below 66.9 ° 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 38.0 °C. The target temperature for this range will not drop below 38.0 °	**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_Flow8tuckOn_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 <47.5 °C <35.6 °C <35.6 °C 9,999 rpm 5.0 seconds > 1.0 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.
			C **Range 3 (Tertiary):** Ambient air temperature is between -9.0 and -9.0 °C Engine Outlet Coolant reaches the start to open temperature of the flow control device to the radiator (ie: thermostat) minus 38.0 °C. The target temperature for this range will not drop below 38.0 °C	**P0128 Maximum Acculated Energy - Tertiary** This diagnostic models the net energy into and out of the cooling system during the warm-up process. The ten energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to transmission oil, heat loss to enviroment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and eat loss to autostop.	The diagnostic will abort if the temperature has dropped by after the customer has commanded the engine off	>5.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 1 Sensor 1 (WRAF& Gen4 ECM	P0131	This DTC determines if the WRAF 02 sensor signal circuit is shorted low. This DTC will detect a short to ground fault to the Pump Current, Reference Cell Voltage, Reference Ground and Trim circuits. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters.	B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals: A) Pump Current - short to ground fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status. C) Reference Ground - short to ground fail counts are accumulated to determine fault status. D) Trim circuit - short to ground fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental). Note: A ground short on the Pump Current or Reference Voltage signal may also set a P223C DTC.	The ASIC provides a fault indication when the pump current, reference cell or reference ground pin is < 150mV. Note: the faults must exist for previous 100 milli - seconds to qualify for a fail flag. The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled B1S1 DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 P0135, P0030, P0031 or P0032 = Valid = Ready = True = Complete > 20.0 seconds	Signal A: 20 failures out of 24 samples OR Signal B: 20 failures out of 24 samples OR Signal C: 20 failures out of 24 samples OR Signal D: 20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips
			B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals:	The ASIC provides a fault indication when the pump current, reference cell, reference ground or	Diagnostic is Enabled B1S1 DTC's Not active this key cycle	 P0135, P0030, P0031 or P0032	Signal A: 20 failures out of 24 samples OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			A) Pump Current - short to ground fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status. C) Reference Ground - short to ground fail counts are accumulated to determine fault status. D) Trim circuit - short to ground fail counts are accumulated to determine fault status. Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	trim circuit fails the following criteria; |Nernst signal - 0.45| >1.0 volts OR |Voltage drop over Rgnd - (internal current source *Rgnd)| >0.5 volts OR CJ136 H/W detection Note: the faults must exist for previous 10 milli - seconds to qualify for a fail flag. The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	= Valid = Ready = True = Complete > 20.0 seconds	Signal B: 20 failures out of 24 samples OR Signal C: 20 failures out of 24 samples OR Signal D: 20 failures out of 24 samples Continuous in 25 milli - second loop	

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.
O2S Circuit High Voltage Bank 1 Sensor 1 (WRAF& Gen4 ECM	P0132	This DTC determines if the WRAF 02 sensor signal circuit is shorted high. This DTC will detect a short to power fault to the Pump Current, Reference Cell Voltage, Reference Ground and Trim circuit. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters.	B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals: A) Pump Current - short to power fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status. C) Reference Ground - short to power fail counts are accumulated to determine fault status. D) Trim Circuit - short to power fail counts are accumulated to determine fault status Note: This ASIC is referred to as ATIC142 (Continental)..	The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin is > 5.2V. Note: the faults must exist for more than 100 msec to qualify for a fail flag. The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled B1S1 DTC's Not active this key cycle Measure Valid Status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete). **************************	 P0135, P0030, P0031 or P0032 = Valid = Ready = True = Complete > 20.0 seconds	Signal A: 20 failures out of 24 samples OR Signal B: 20 failures out of 24 samples OR Signal C: 20 failures out of 24 samples OR Signal D: 20 failures out of 24 samples Frequency: Continuous in 25 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals: A) Pump Current - short to power fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status. C) Reference Ground - short to power fail counts are accumulated to determine fault status. D) Trim Circuit - short to power fail counts are accumulated to determine fault status <u>Note:</u> This ASIC is referred to as CJ136 (next Gen of CJ135 from Bosch).	The ASIC provides a fault indication when the pump current, reference cell, reference ground or trim circuit pin fail the following criteria; CJ136 H/W detection Note: the faults must exist for more than 10 msec to qualify for a fail flag. The four fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled B1S1 DTC's Not active this key cycle Measure Valid Status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete). **************************	 P0135, P0030, P0031 or P0032 = Valid = Ready = True = Complete > 20.0 seconds	Signal A: 20 failures out of 24 samples OR Signal B: 20 failures out of 24 samples OR Signal C: 20 failures out of 24 samples OR Signal D: 20 failures out of 24 samples Frequency: Continuous in 25 milli - second loop	

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.
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 < Amps < 4.3	Diagnostic is Enabled No Active DTC's System Voltage Heater Warm-up delay 02S Heater device control B1S1 02S Heater Duty Cycle All of the above met for	 ECT_Sensor_FA >10.5 Volts = Complete = Not active > zero >120 seconds	/failures out of 9 samples Frequency: 2 tests per trip 10 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit Low Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0137	This DTC determines if the 02 sensor signal circuit is shorted low. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is below the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	< 40mvolts	Diagnostic is Enabled No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	 TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSyste m_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.5 < Volts = Not active = Not active = Not active = Not active = False = False 0.991< ratio <1.040 150< mgrams <800 = Closed Loop = TRUE (Please see **"Closed Loop Enable**	320 failures out of 400 samples Frequency: Continuous in 100 milli-second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Clarification" in Supporting Tables).		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol < 87 %		
					Ethanol Estimation in Progress	= Not Active (Please see **"Ethanol Estimation in Progress"** in Supporting Tables).		
					Fuel State	DFCO not active		
					All of the above met for	> 20.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Circuit High Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0138	This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold. The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.	Oxygen Sensor Signal	> 1,050 mvolts	Diagnostic is Enabled No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault *********************** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio *********************** All of the above met for	 TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.5 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False *********************** > 140.0 seconds when engine soak time > 28,800 seconds > 140.0 seconds when engine soak time < 28,800 seconds <1.040 EQR *********************** > 3.0 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli-second loop	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 Slow Response Rich to Lean Bank 1 Sensor 2	P013A	The P013A diagnostic is the third in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used. <u>Primary method:</u> The P013A diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.28 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units < 7.2 units > 28.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemBl TFTKO FuelTrimSystemB2 TFTKO EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTKO 02S_Bank_ 2_TFTKO P013B, P013E, P013F, P2270 or P2271 >10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable)	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between an upper and lower voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Ais set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:			Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed =================== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. <75.0Nm P2270 (and P2272 if applicable) P013E (and P014A if applicable) ==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required lower voltage threshold before the accumulated mass air flow threshold is reached.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	The P013B diagnostic is the sixth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary 02 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used. Primary method: The P013B diagnostic measures the secondary 02 sensor voltage response rate	Primary Method: The EWMA of the Post 02 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.28 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units < 7.2 units > 150 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 600 mvolts)	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemBl TFTKO FuelTrimSystemB2 TFTKO EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013A, P013E, P013F, P2270 or P2271 >10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations:	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTCP013Bis set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:			Green Cat System Condition Low Fuel Condition Only when FuelLevelDataFault Post fuel cell DTC's Passed =================== After above conditions are met: Fuel Enrich mode continued.	B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service). = False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. P2270 P013E P013A P2271 P013F ==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		This fault is set if the secondary 02 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached.			================= During this test the following must stay TRUE or the test will abort: 0.950 < Base Commanded EQR < 1.100 ================ During this test: Engine Airflow must stay below: and the delta Engine Airflow over 12.5msec must be :	================== ================== 80 gps < 15.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	The P013E diagnostic is the second in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached.	Post 02 sensor voltage AND The Accumulated mass airflow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is	> 450 mvolts >28 grams > 1 secs >0.0 grams	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemBI TFTK 0 FuelTrimSystemB2 TFTK 0 EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTKO 02S_Bank_ 2_TFTKO P013A, P013B, P013F, P2270 or P2271 >10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations:	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed Number of fueled cylinders ================== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. <75.0Nm P2270 < 3 cylinders ==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	The P013F diagnostic is the fifth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required voltage before the accumulated mass airflow threshold is reached.	Post 02 sensor voltage AND The Accumulated mass airflow monitored during the Delayed Response Test	< 350 mvolts >200 grams	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	 TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemBl TFTK0 FuelTrimSystemB2 TFTK0 EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013A, P013B, P013E, P2270 or P2271 >10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations:	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Green Cat System Condition	B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Low Fuel Condition	= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Only when FuelLevelDataFault	= False		
					Post fuel cell	= False		
					DTC's Passed	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Number of fueled cylinders	P2270 P013E P013A P2271		
					===================	> 1 cylinders		
					After above conditions are met: Fuel Enrich mode	==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					entered. ================= During this test the following must stay TRUE or the test will abort: 0.950 < Base Commanded EQR < 1.100 ================= During this test: Engine Airflow must stay below: and the delta Engine Airflow over 12.5msec must be :	================== ================ 80 gps < 15.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
O2S Heater Performance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0141	This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 > amps > 2.5	Diagnostic is Enabled No Active DTC's System Voltage Heater Warm-up delay 02S Heater device control B1S1 02S Heater Duty Cycle All of the above met for	ECT_Sensor_FA >10.5 Volts = Complete = Not active > zero > 120 seconds	/failures out of 9 samples Frequency: 2 tests per trip 10 seconds delay between tests and 1 second execution rate.	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 Delayed Response Rich to Lean Bank 1 Sensor 1) (WRAF	P015A	DTC P015A detects that the primary WRAF oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor rich to lean tests (P013E / P013A/ P2271), which commands fuel cut off. Note: The Primary method is used when the primary WRAF 02 sensor signal transitions from above to below the 02 measured EQR threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P015A diagnostic measures the primary WRAF 02 sensor response time between a rich condition above a starting measured EQR threshold and a lower measured EQR threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro,	Primary method: The EWMA of the Pre 02 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. This method calculates the result when the WRAF 02 sensor measured EQR is OR Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test. AND Pre WRAF 02 sensor measured EQR is	> 0.57 EWMA (sec) < 0.50 EWMA (sec) < 0.600 EQR > 2.5 Seconds > 0.300 EQR	Diagnostic is Enabled No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemBI _TFTK0 FuelTrimSystemB2 TFTK0 EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271 >10.5 Volts = Not active = Not active = Not active = Not active = False	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and intake air temperature resulting in a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015A is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method:</u> This fault is set if the primary WRAF 02 sensor does not achieve the required lower measured EQR			Green 02S Condition 02 Heater (pre sensor) on for Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active	= False = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 30 seconds > 50 °C =TRUE) > -40 °C > 30 seconds 1,100 < RPM < 3,000 1,000 < RPM < 3,100 2.0 < gps < 20.0 34.2 < MPH < 80.8 31.1 < MPH < 87.0 0.80 < C/L Int < 1.08 = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		threshold before a delay time threshold is reached.			Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State =================== All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested. =================== Pre O2S EQRB1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders =================== After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).	(Please see **“Closed Loop Enable Clarification”** in Supporting Tables), not in control of purge = Not Active (Please see **“Ethanol Estimation in Progress”** in Supporting Tables). > 70kpa = enabled = not active = not active > 60.0 sec 500 < °C < 850 = DFCO possible ================== ================== > 0.970 EQR = DFCO active < 3 cylinders ==================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (WRAF	P015B	DTC P015B detects that the primary WRAF oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor lean to rich tests (P013F / P013B), which commands fuel enrichment. Note: The Primary method is used when the primary WRAF 02 sensor signal transitions from lean condition to above the 02 measured EQR threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P015B diagnostic measures the primary WRAF 02 sensor response time between a lean condition and a higher measured EQR threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in	Primary method: The EWMA of the Pre 02 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary method: The Accumulated time monitored during the L2R Delayed Response Test. AND Pre WRAF 02 sensor measured EQR is OR At end of Cat Rich stage the Pre WRAF 02 sensor measured EQR is	> 0.60 EWMA (sec) < 0.55 EWMA (sec) > 2.0 Seconds < 1.080 EQR < 0.970 EQR	Diagnostic is Enabled No Active DTC's P015Atest is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemBI _TFTK0 FuelTrimSystemB2 TFTK0 EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271 = Passed >10.5 Volts = Not active = Not active = Not active = Not active	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015B is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method: This fault is set if the primary WRAF 02 sensor does not achieve the required higher measured EQR threshold before a delaytime threshold is			Only when FuelLevelDataFault Green 02S Condition 02 Heater (pre sensor) on for Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	= False = False = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. > 30 seconds > 50 °C =TRUE) > -40 °C > 30 seconds 1,100 < RPM < 3,000 1,000 < RPM < 3,100 2.0 < gps < 20.0 34.2 < MPH < 80.8 31.1 < MPH < 87.0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		reached.			Closed loop integral Closed Loop Active Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on time Predicted Catalyst temp Fuel State Number of fueled cylinders ================ When above conditions are met: Fuel Enrich mode is entered. ================ During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	 0.80 < C/L Int < 1.08 = TRUE (Please see **“Closed Loop Enable Clarification”** in Supporting Tables). not in control of purge = Not Active (Please see **“Ethanol Estimation in Progress”** in Supporting Tables). > 70kpa = enabled = not active = not active > 60.0 sec 500 < °C < 850 = DFCO inhibit > 1 cylinders ================== ================== 0 < gps < 80 < 15.0QDS		

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.
Fuel System Too Lean Bank 1	P0171	Determines if the primary fuel control system for Bank 1 is in a lean condition, based on the filtered long-term purge-on, long term purge-off and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefore values > 1.0 indicates a Lean condition. A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.	The filtered, adjusted for purge flow, long-term fuel trim metric, OR the filtered, non-adjusted purge-on long-term fuel trim metric AND The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria) If a fault has been detected the filtered, adjusted for purge flow, long-term fuel trim metric, AND the filtered, non-adjusted purge on long-term fuel trim metric AND The filtered short-term fuel trim metric to repass the diagnostic.	>= 1.350 >= 1.900 >= 0.100 < 1.300 < 1.900 < 2.000	The primary fuel trim diagnostic is enabled Engine speed BARO Coolant Temp Coolant Temp MAP Inlet Air Temp MAF Fuel Level Long Term Fuel Trim data accumulation: Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	400 <rpm< 6,500 > 70 kPa > -20 °C (or OBD Coolant Enable Criteria = TRUE) < 135 °C 18 <kPa< 255 -20 <°C< 150 1 <g/s< 1,000 > 10% or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 30.00 seconds of data must accumulate on each trip, with at least 15.00 seconds of data in the current fuel trim cell before a pass or fail decision can be made. Additional time can be required for cold ambient starts to accommodate larger minimum LTM's for startability reasons. See **Startup Engine Coolant adjusment to Minimum accumulation time** . (Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis)	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Closed Loop Long Term FT	Enabled Enabled (Please see **"Closed Loop Enable Clarification"** and **"Long Term FT Enable CriteriaPrimary Long Term Fuel Trim Enable Criteria"** in Supporting Tables.)		
					EGR Diag. Catalyst Diag. Post 02 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active		
					-------------------------------- Delay during GPF Regeneration Standard startup delays are re-initialized following completion of GPF Regen to allow system stabilization. (See "Long Term Fuel Trim data accumulation" above.)	-------------------------------- No Delay		
					--------------------------------- No active DTC:	--------------------------------- 1AC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit.FA MAP_EngineVacuumStatus AmbPresDfltdStatus TC_BoostPresSnsrFA O2S_Bank_1_Sensor_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric.A normally operating system operates centered around long-term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values < 1.0 indicate a rich condition. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. If during this period of time the filtered long-term fuel trim metric exceeds the threshold a fault will be set. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria) ***************************** **Intrusive Test:** For 2 out of 3 intrusive segments The filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria)	 <= 0.710 <= 2.000 ************************* <= 0.715 <= 0.710 <= 2.000 If a fault has been detected (by the passive or intrusive test) the long-term fuel trim metric must be > 0.710 and the short-	 ****************************** Purge Vapor Fuel	Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered. ****************************** <= 22.00% Intrusive Test is inhibited when Purge Vapor percentage is greater than this threshold. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used) A minimum number of accumlated Fuel Trim Data samples are required to adequately learn a correct Purge Vapor Fuel value. See the table **Minimum Non-Purge Samples for Purge (Vapor Fuel)** for the Purge Off cells used to validate the Purge Vapor Fuel parameter.	Frequency: 100 ms Continuous Loop ******************* **Segment Definition:** Segments can last up to 60 seconds and are separated by the lesser of 20.00 seconds of purge-on time or enough time to purge 36 grams of vapor. A maximum of 3 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.715 , the test passes without intrusively checking the filtered Non-Purge Long Term Fuel Trim metric. However if the filtered Purge Long Term Fuel Trim metric is<= 0.715, the Intrusive test is invoked. The purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If during 2 out of 3 intrusive segments, the filtered Purge Long Term Fuel Trim metric <= 0.710 the fault will set. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several		term fuel trim metric must be > 0.000 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.71 until the diagnostic repasses after a failure.		If the accumulated purge volume is > 1,400.0 grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is > 22.0%.	time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.715 for at least 150.00 seconds, indicating that the canister has been purged.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		segments allowing Purge to renable between segments. Likewise, for these reasons, if after the 3 intrusive segments the diagnostic continues to pass, there is a delay period of 300 seconds to allow sufficient time to purge excess vapors from the canister, before re-evaluating a Rich condition if it still exists.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 1 Circuit Low Fault	P0182	This DTC diagnose SENT fuel rail temperature sensor 1 that is too low out of range. If the sensor digital value (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	< 145	Fuel Temperature Out of Range Diagnoistic Enabled	True	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Intenal Error Fault Active (P126E) Fuel Temperature Sensor SENT Message Error Fault Active (P128C)		
					No Fault Pending on	SENT Intenal Error Fault Pending (P126E) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 1 Circuit High Fault	P0183	This DTC diagnose SENT fuel rail temperature sensor 1 that is too high out of range. If the sensor digital value (repressing the refernce voltage) is above the upper digital threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the high sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	> 1,865	Fuel Temperature Out of Range Diagnoistic Enabled	True	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Intenal Error Fault Active (P126E) Fuel Temperature Sensor SENT Message Error Fault Active (P128C)		
					No Fault Pending	SENT Intenal Error Fault Pending (P126E) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 2 Circuit Low Fault	P0187	This DTC diagnose SENT fuel rail temperature sensor 2 that is too low out of range. If the sensor digital value (repressing the refernce voltage) is below the lower digital read threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	< 145.00	Fuel Temperature Out of Range Diagnoistic Enabled	True	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128D)		
					No Fault Pending	SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 2 Circuit High Fault	P0188	This DTC diagnose SENT fuel rail temperature sensor 2 that is too high out of range. If the sensor digital value (repressing the refernce voltage) is above the upper digital read threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the high sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	> 1,865.00	Fuel Temperature Out of Range Diagnoistic Enabled	True	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
					No Fault Active on	SENT Communication Fault Active (U0625, U101B, U0670, U0671) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128D)		
					No Fault Pending	SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows) a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFDBR_cmp_FPSS_ MinPres Variance ; Otherwise, Report status as Pass b] Intrusive test freq limit: 60 sec between intrusive tests that pass, c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate	Sensed fuel pressure change [absolute value, during intrusive test]	>= 30.00 kPa	a) Diagnostic is .. b) Timer Engine Running c1) Fuel Flow Rate Valid c2) Fault bundle FDB_FuelPresSnsrCktFA c3) Reference Voltage Fault Status [DTC P0641] c4) Fault bundle FAB_FuelPmpCktFA c5) Fuel Control Enable Fault Active [DTC P12A6] c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c7) Fuel Pump Speed Fault Active [DTCP129F] c8) CAN Sensor Bus message $0C3 Comm Fault [DTCP165C] c9) CAN Sensor Bus Fuel Pmp Speed Command ARC and Checksum Comm Fault Code [DTC U18A7] c10) Fuel Pump Duty Cycle Fault Active c11) Sensor Configuration [Wired to FTZM?] c12) Sensor Bus Relay On d) Emissions Fuel Level Low [Message $3FB] e) Fuel Control Enable f) Fuel Pump Control State g) Instantaneous Fuel	a) ENABLED b) >= 5.00 seconds c1)== TRUE c2) == False c3) == False c4] == False c5) == False c6) == False c7) == False c8) == False c9] == False c10) == False c11) == CeFDBR_e_WiredTo_FT ZM c12) == TRUE d) == False e) == TRUE f) == Normal Control OR == Fuel Pres Sensor Stuck Control g) >= 0.05 gm/sec	1 sample/ 12.5 millisec Intrusive Test Duration: Fuel Flow - related (5 to 12 sec)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Flow h) Diagnostic System Disabled j1) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [DTCU18A7] j2) CAN Sensor Bus message $0C3_Available j3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus B $0C3][DTC U18A7]	h) == False j1)== False j2) == TRUE j3) == False		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT SIDI High Pressure Sensor Performance	P0191	The DTC determines if there is a skewed control fuel rail sensor (Sensori) via a comparison to diagnostic sensor (sensor2) continuously when the engine is running and the commanded pressure is steady.	Primary sensor (P1) vs. Secondary sensor (P2) performance rationality ((Low Limit fail Filtered Fuel Control Error) OR (High Limit Fail: Filtered Fuel Control Error)) AND (Filtered Absolute delta between sensori and sensor2	<= **P0191 - Low fail limit of fuel control due to pressure sensor skewed low** (See supporting table) >= **P0191 - High fail limit of fuel control due to high pressure sensor skewed High** (see Supporting table) >= 1.00 mpa Note: fuel control error is calcuated based on the squreroot of senorl divided by sensor2, this value is filter to ensure proper failure detection. Absolute delta between sensori and sensor2 value is filter to ensure proper failure detection.	Commanded Pressure rate of change (increasing or dercresing) fora period of time	<0.70 mpa >= 1.25 seconds Enabled when a code clear is not active or not exiting device control	Filter Fuel Control Error term and Absolute delta between sensori and sensor2 exceed Low or High Fail limit for a duration >= 1.50 seconds This is diagnostic runs Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure Sensor 1 Out of Range	P0192	This DTC diagnose SENT high pressure sensor 1 that is too low out of range. If the sensor digital value (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	High Pressure Rail Sensor 1 SENT digital read value	=< 66			Time Based: 400 Failuerout of 500 Samples 6.25 ms per 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.
Engine Oil Temperature (EOT) Circuit Low	P0197	Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Engine Oil Temperature Sensor (EOT) Circuit Resistance	< 25 ohms	Diagnostic Status	Enabled	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Coolant Temperature Dropped Below Diagnostic Monitoring Temperature -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	60.0 °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_Flow8tuckOn_FA >30.0 seconds >1.0 km > 55.0 kPa >-9.0 °C > 66.9 °C > **P01F0 - Heat To Coolant Min 2D** < 20.0 seconds < 9,999 Half Cylinder Mode	48 seconds out of a 60 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.
Injector 1 Open Circuit - (SIDI)	P0201	Controller specific output driver circuit diagnoses Injector 1 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 1 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 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. Or 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 >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 2 Open Circuit - (SIDI)	P0202	Controller specific output driver circuit diagnoses Injector 2 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 2 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 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. Or 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 >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Injector3 Open Circuit - (SIDI)	P0203	Controller specific output driver circuit diagnoses Injector 3 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 3 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 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. Or 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 >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 - (SIDI)	P0204	Controller specific output driver circuit diagnoses Injector 4 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 4 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 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. Or 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 >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short low or open in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough.	TPS2 % Vref < (100% corresponds to 5.0 Volt)	5.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
TPS2 Circuit High	P0223	Detects a continuous or intermittent short high in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too high. This diagnostic only runs when battery voltage is high enough.	TPS2 % Vref > (100% corresponds to 5.0 Volt)	91.80 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Boost Pressure (TIAP) Sensor Performance (single turbo)	P0236	Detects a performance failure in the Turbocharger Boost Pressure sensor, such as when a Turbocharger Boost Pressure value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the Turbocharger Boost	**<u>Engine Running:</u>** See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND	> 20.0 grams/sec > 25.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 250 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Powertrain Relay Voltage for a period of time Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) -20 Deg C <= 100 Deg C >= 9.1 Volts >= 0.2 Seconds >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Pressure sensor. In this case, the Turbocharger Boost Pressure Performance diagnostic will fail.	Measured TIAP - measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow	> 30.0 kPa > 30.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm/sec as a function of engine speed See table	No Active DTCs:	**P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND Manifold Pressure AND Filtered Mass Air Flow - Mass Air Flow Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	**P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow** > a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP** < 3.0 gm/sec < a threshold in gm/ sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow** < a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP** < 3.0 gm/sec	No Pending DTCs: Diagnostic is Enabled	AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Boost Pressure Sensor Circuit Low	P0237	Detects a continuous short to ground in the Turbocharger Boost Pressure signal circuit by monitoring the Turbocharger Boost Pressure sensor output voltage and failing the diagnostic when the Turbocharger Boost Pressure voltage is too low. The Turbocharger Boost Pressure sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	Turbocharger Boost Pressure Voltage	< 14.4% of 5 Volt Range (This is equal to 50.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Boost Pressure Sensor Circuit High	P0238	Detects a continuous short to power or open circuit in the Turbocharger Boost Pressure signal circuit by monitoring the Turbocharger Boost Pressure sensor output voltage and failing the diagnostic when the Turbocharger Boost Pressure voltage is too high. The Turbocharger Boost Pressure sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	Turbocharger Boost Pressure Voltage	> 85.8% of 5 Volt Range (This is equal to 371.0 kPa)	Diagnostic is Enabled		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit Low	P0245	Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid 'A' actuator' 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. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, turbocharger 'A'is associated with engine bank 1.	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. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	< 0.5 Q impedance between output and controller ground	Diagnostic enabled ***************************** Powertrain relay voltage Ignition run crank voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts >5.00 Volts *****************************	10 failures out of 12 samples 100ms /sample	Type A, 1 Trips Note: In certain controllers P0243 may also set turbocharger wastegate / supercharger boost solenoid A control circuit

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit High	P0246	Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid 'A' actuator' 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. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, turbocharger 'A'is associated with engine bank 1.	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. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	< 0.5 Q impedance between output and controller power	Diagnostic enabled ***************************** Powertrain relay voltage Ignition run crank voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts >5.00 Volts *****************************	10 failures out of 12 samples 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.
Injector 1 Low side circuit shorted to ground (SIDI)	P0261	Controller specific output driver circuit diagnoses Injector 1 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.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to power (SIDI)	P0262	Controller specific output driver circuit diagnoses Injector 1 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to ground (SIDI)	P0264	Controller specific output driver circuit diagnoses Injector 2 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.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to power (SIDI)	P0265	Controller specific output driver circuit diagnoses Injector 2 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Injector3 Low side circuit shorted to ground (SIDI)	P0267	Controller specific output driver circuit diagnoses Injector 3 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.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Injector3 Low side circuit shorted to power (SIDI)	P0268	Controller specific output driver circuit diagnoses Injector 3 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to ground (SIDI)	P0270	Controller specific output driver circuit diagnoses Injector 4 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.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 Low side circuit shorted to power (SIDI)	P0271	Controller specific output driver circuit diagnoses Injector 4 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.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Turbo/Super Charger Engine Underboost Wastegate Position Deviation; Turbocharge r with electronic wastegate.	P0299	This DTC indicates a wastegate position deviation which will lead into an underboost situation.	Wastegate Position deviation Error = (Expected Wastegate Position - Actual Wastegate Position)	< refer to **P0299: WG negative deviation fail threshold over engine speed and desired torque.** + **P0299: Additive offset on WG negative deviation ambient correction,** in Supporting tables.	Dev. Diagnostic enable **************************** Coolant temperature or OBD Coolant Enable Criteria and Coolant temperature and not OBD Max Coolant Achived **************************** Engine speed **************************** Desired Torque **************************** Desired Torque derivative in range Actual wastegate position in range Actual wastegate position derivative in range **************************** All conditions haveto be fulfilled for:	True **************************** > -40.0 °C < 150.0 °C **************************** > refer to **P0234 P0299: Engine speed minimum limit over Ambient pressure to enable the WG deviation diagnosis,** in Supporting tables. **************************** > refer to **P0234 P0299: Desired torque minimum limit overAmbient pressure to enable the WG deviation diagnosis,** in Supporting tables **************************** > -30.00 Nm/sec < 30.00 Nm/sec > 40.00 % < 100.00 % > -15.00 %/sec < 15.00 %/sec **************************** > refer to	25 failures out of 30 samples 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.
					**************************** No active DTCs: **************************** No device control active for compresseor recirculation valve.	**P0234 P0299: Wastegate position deviation diagnostic enable delay as a function of engine speed and ambient pressure** in Supporting table **************************** WGAR_b_WG_CktFA NaWGAR_b_PstnCntrlFA CRAR_b_CRV_CktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA AmbientAirDefault ****************************		

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	Diagnostic to determine if Cylinder 1 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cylinder 2 Injector Circuit Range/ Performance	P02EF	Diagnostic to determine if Cylinder 2 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

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	Diagnostic to determine if Cylinder 3 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

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	Diagnostic to determine if Cylinder 4 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise. Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for duration of Trip Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab **> RufSCD_Decel** AND **> RufSCD_Jerk)** **> SCD_Decel** AND **> SCD_Jerk)** **> RufCyl_Decel** AND **> RufCyl_Jerk)** **> CylModeDecel** AND **> CylModeJerk)** **>RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution "ECT" If OBD Max Coolant Achieved = FALSE -12°C< ECT Or if OBD Max Coolant Achieved = TRUE -12°C<ECT< 130°C < -12°C If OBD Max Coolant Achieved = FALSE 21°C < ECT If OBD Max Coolant Achieved = TRUE 21°C < ECT < 130°C 9.00 < volts < 32.00 < 20.50 % per 25 ms < 20.50 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for(1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel)	**> CylModeDecel * PairCylModeDecel**				
			BANK MISFIRE Cylinders above Bank Thresholds	>= 4 cylinders				
			(Medres_Decel	**> RufSCD_Decel * Bank_SCD_Decel**				
			AND Medres_Jerk)	**> RufSCD_Jerk * Bank_SCD_Jerk**				
			OR (Medres_Decel	**>SCD_Decel * Bank_SCD_Decel**				
			AND Medres_Jerk)	**> SCD_Jerk * Bank_SCD_Jerk**				
			OR (Lores_Decel	**> RufCyl_Decel * BankCylModeDecel**				
			AND Lores_Jerk)	**> RufCyl_Jerk * BankCylModeJerk**				
			OR (Lores_Decel	**> CylModeDecel * BankCylModeDecel**				
			AND Lores_Jerk)	**> CylModeJerk * BankCylModeJerk**				

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CylBeforeDeacCyl_Jerk) OR IF option Crank based IMEP estimate is Enabled and CrankBasedJMEP is Misfire Percent Emission Failure Threshold Misfire Percent Catalyst	**> CylModeJerk * ClyBeforeAFM_Jerk * RandomAFM_Jerk** IMEP Enabled < **Misfire_IMEP_Thresh _vs_BinlD** (Note: Thresholds uses following tables to pick threshold vs BinlD. See supporting tables for more information on how BinlD works to select appropriate calibration threshold) **Misfire_IMEP_BinlD_ vs_RPM_Load Misfire_IMEP_BinlD_ RPM_Axis Misfire_IMEP_BinlD_ Load_Axis** - see details on Supporting Tables Tab > 2.63%P0300 >				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Damage	**Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.				
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	< 0 FTP rpm AND < 0 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 0 rpm AND > 0 % load AND < 180 counts on one cylinder		
					Engine Speed	600 < rpm < ((Engine Over Speed Limit) - 400) OR 8,191) Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						CamLctnExhFA CamSensorAnyLctnTFTK0 AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus		
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	# Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 7,200 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	**< ZeroTorqueEngLoad** or **<ZeroTorqueAFM** if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	< 1.3% (< 1.3% in AFM) >22mph (>22mphAFM)	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					NEGATIVE TORQAFM If deactivated cylinders appear to make power, torque is negative: DeactivatedCyl_Decel AND DeactivatedCyl_Jerk AND # of Deact Cyls Inverted	**<DeacCylInversionDecel** **<DeacCylInversionJerk** > 2 cylinders	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 95.00 %	7 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	
					Delay if PTC engaged	Enabled	4 cycle delay	
					Delay if error in indices of buffered data is detected and delay is enabled	Delay Enabled	3 cycle delay	
					Delay if IMEP calculation	initializing on startup or running resets (expires before rpm enablement)	4 cycle delay	
					******************************	******************************	*******************	
					This Feature not used on Gasoline engines			
					Combustion Mode	**= InfrequentRegen** value in Supporting Tables	0 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Driver cranks before Wait to Start lamp extinguishes	IF TRUE	**WaitToStart** cycle delay	
					Brake Torque ******************************	> 199.99% Max Torque ******************************	0 cycle delay ******************	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring:	**> "Ring Filter"** # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	**> "Number of Normals"** # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal).)			
					Used Off Idle, and while not shifting,			
					TPS	> 0 %		
					Engine Speed	> 900 rpm		
					Veh Speed	> 3 mph		
					Auto Transmission	not shifting		
					indivdual candidate deemed abnormal if number of			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					the 100 engine cycles. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages			
					Pattern Recog Enabled:	Enabled		
					Pattern Recog Enabled during Cylinder Deac	Not Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	Disabled		
					Engine Speed Veh Speed	1,100 < rpm < 6,100 > 3.1 mph		
					The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire thresholds in effect at that speed and load. (CylAfter_Accel AND	> Misfire_ decel * **1st_FireAftrMisfr_Acel**		
					CylAfter_Jerk)	> Misfire_Jerk * **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_ decel * **IstFireAftrMisAcelAFM** > Misfire_Jerk * **IstFireAfterMisJerkAFM**		
					Addtionally, the crankhaft			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					is checked again a small calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddtjerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.			
					Num of Cylinders after misfire to start check of crankshaft snap	2 Cylinders		
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire**		
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Ratio of Unrecog/Recog	>1.00	discard 100 engine cycle test	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND No Active DTCs	Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only)	4 cycle delay	
					******************************	******************************	*******************	
					Default Action			
					Isolator Resonance Default Action Option	Not Enabled		
					******************************	******************************	*******************	
					If Isolator Resonance Option Enabled AND Misfire P030xTFTKO	Set engine speed limits: 0 < Eng RPM < 9,000		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range on a per cylinder basis due to Excessive Knock (either real or false knock). In the knock detection algorithm, the term “Knock Intensity” (KI) is used to define the relative size of a knock event, and is calculated as (KI = current knock event - knock threshold). This results in a KI amplitude that is proportional to the size of the knock event (as seen by the knock sensor). In addition, Knock Intensity cannot be less than zero as it is forced/limited to be = 0 with no knock detected (i.e. whenever the current knock event < knock threshold, KI = 0). This diagnostic calculates a first-order lag filter version of the Knock Intensity and sets a fault when: (Filtered KI) > (Excessive Knock Diagnostic Threshold)	Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	**> P0324_PerCyl_ExcessiveKnock_Threshold** (no units)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 0.0 seconds > 650 RPM AND < 8,500 RPM >0 mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C > 110 revs	First Order Lag Filters with Weight Coefficient = 0.0260 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit Sensor 1/Bank 1. There are two possible methods used: **1.20 kHz Method:** This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op-Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B, High output for an Open Circuit (because	Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise): Filtered FFT Output Filtered FFT Output	= **P0325_P0330_OpenMethod_2** **Case 1 (20 kHz Method):** **> P0325_P0330_OpenCktThrshMin (20 kHz) AND < P0325_P0330_OpenCktThrshMax (20 kHz)** **Case 2 (Normal Noise Method):** **> P0325_P0330_OpenCktThrshMin (Normal Noise) AND < P0325_P0330_OpenCktThrshMax (Normal Noise)**	Diagnostic Enabled? Engine Run Time Engine Speed Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature	Yes > 0.0 seconds > 650 RPM and < 8,500 RPM > 161 revs > 70 mg/cylinder and < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0088 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		the 20 kHz injected signal is detected only on one of the sensor inputs). The 20 kHz method is typically used for the entire operating region of the engine. However, some engines may not have adequate separation between good and bad circuits at high engine speed. In these cases the 20 kHz method is used at low and medium engine speeds, and the "Normal Noise" method is used at high engine speed only. 2. **Normal Noise:** The Normal Noise method monitors the background engine noise level for a selected frequency range output of the knock detection FFT. The background noise (i.e. Normal Noise) is filtered with a first-order lag filter. A good circuit is determined when the filtered Normal Noise signal is greater than the threshold. See Supporting Tables for method definition: **P0325_P0330_OoenM**						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		ethod defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM). Typical implementations: A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an abnormally low output due to being unattached (or loosely attached) with the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic threshold.	Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise for a selected frequency) Filtered FFT Intensity	**Case 1: Engine not in AFM mode** < **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table) OR **Case 2: Engine is in AFM mode** < **P0326_P0331_AbnormalNoise_Thresh_AFM** (Supporting Table; Engine is in AFM mode)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 0.0 seconds > 2,250 RPM (not in AFM mode) OR > 2,250 (in AFM mode) AND < 8,500 RPM > 70mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C **P0326_P0331-AbnormalNoiseCylsEnabled** (Supporting Table) > 333 Revs	First Order Lag Filters with Weight Coefficient = 0.0043 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	< 8.0 Percent (of 5.0 Volt reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	> 39.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit Sensor 2/Bank 2 There are two possible methods used: **1.20 kHz Method:** This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op-Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B, High output for an	**Individual Sensor Thresholds Enabled?** **Open Circuit Method chosen** (2 possible methods: 20 kHz or Normal Noise): Filtered FFT Output Filtered FFT Output	= 1 , Use Case 3 and 4 = **P0325_P0330_OpenMethod_2** (supporting table) **Case 1 (20 kHz Method):** **>** **P0325_P0330_OpenCktThrshMin (20 kHz)** **AND** < **P0325_P0330_OpenCktThrshMax (20 kHz)** **Case 2 (Normal Noise Method):** **>** **P0325_P0330_OpenCktThrshMin (Normal Noise)** **AND** < **P0325_P0330_OpenCktThrshMax (Normal Noise)** **Case 3 (20 kHz Method):**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature	Yes > 0.0 seconds > 650 RPM and < 8,500 RPM ≥161 revs > 70 mg/cylinder and < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C	First Order Lag Filter with Weight Coefficient **Case 1 & 2:** Weight Coefficient = 0.0088 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Open Circuit (because the 20 kHz injected signal is detected only on one of the sensor inputs). The 20 kHz method is typically used for the entire operating region of the engine. However, some engines may not have adequate separation between good and bad circuits at high engine speed. In these cases the 20 kHz method is used at low and medium engine speeds, and the "Normal Noise" method is used at high engine speed only. 2. **Normal Noise:** The Normal Noise method monitors the background engine noise level for a selected frequency range output of the knock detection FFT. The background noise (i.e. Normal Noise) is filtered with a first-order lag filter. A good circuit is determined when the filtered Normal Noise signal is greater than the threshold. See Suooortinq Tables	Filtered FFT Output Filtered FFT Output	> **P0330_OpenCktThrshMin2 (20 kHz)** AND < **P0330_OpenCktThrshMax2 (20kHz)** **Case 4 (Normal Noise Method):** > **P0330_OpenCktThrshMin2 (NN)** AND < **P0330_OpenCktThrshMax2 (NN)**			**Case 3 & 4** Weight Coefficient = 0.01 Updated each engine event	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		for method definition: **P0325_P0330_OpenMethod** defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM). Typical implementations: A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM For each method the failure thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Performance Bank 2	P0331	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an Abnormally low output due to being unattached (or loosely attached) with the the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic threshold. The failure thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor.	Individual Sensor Thresholds Enabled? Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise) Filtered FFT Intensity	= 1, Use Case 3 and 4 **Case** 1: **Engine <u>not</u> in AFM mode** < **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table) OR **Case 2: Engine <u>is</u> in AFM mode** < **P0326_P0331_AbnormalNoise_Thresh_AFM** (Supporting Table) **Case 3: Engine not in AFM mode** < **P0331_AbnormalLo2** (Supporting Table) OR **Case 4: Engine is in AFM mode** < **P0331_AbnormalLoAFM_2** (Supporting Table)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 0.0 seconds > 2,250 RPM (not in AFM mode) OR > 2,250 (in AFM mode) AND < 8,500 RPM > 70mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C **P0326_P0331-AbnormalNoiseCylsEnabled** (Supporting Table) > 333 Revs	First Order Lag Filter with Weight Coefficient **Case 1 & 2:** Weight Coefficient = 0.0088 Updated each engine event **Case 3 & 4:** Weight Coefficient = 0.01 Updated each engine eventFirst	Type B, 2 Trips

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.
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	< 8.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	> 39.00 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Crankshaft Position (CKP) SensorA Circuit	P0335	Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass.	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	Test is Enabled = FALSE > 0.3 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 0.1 seconds	Engine is Running Starter is not engaged	Test is Enabled	Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	Test is Enabled P0365 P0366	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) SensorA Performance	P0336	1. Fail counts will occur if the engine goes out of synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	Test is Enabled >= 0.3 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	Test is Enabled	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	Test is Enabled = FALSE > 0.3 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 pulses > 65,535 pulses	Engine is Running OR Starter is engaged No DTC Active:	Test is Enabled P0365 P0366	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	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	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	Test is Enabled = FALSE > 0.3 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	Test is Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3 >= 0 counts	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:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled 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 SensorA	P0341	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses = region 3 >= 0 counts	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:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	Type A, 1 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled 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 auto-start's to verify that the crankshaft is in the expected position- diagnostic will fail if the crankshaft is not in the expected range otherwise the diagnostic will pass	Crankshaft position is in error by a number of crankshaft wheel teeth	> 2 crankshaft teeth	Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	Test is Enabled CrankSensor_FA	2 failures out of 3 samples a sample occurs at each hybrid auto-start	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:	Test is Enabled CrankSensor_FA	4 failures out of 5 samples a sample occurs each hybrid auto-start	

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	Detects if the crankshaft is not rotating in the correct direction- will fail if the engine is reported to be spinning backwards while the engine is running otherwise the diagnostic will pass.	Number of crankshaft sensor reversals within a period of time	>= 3 pulses <= 10.0 seconds	 Engine Speed Engine Speed Engine Air Flow Engine Movement Detected No Active DTCs:	Test is Enabled > 400 RPM < 2,000 RPM >= 0.3 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.
IGNITION CONTROL #1 CIRCUIT	P0351	Diagnoses Cylinder #1 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT	P0352	Diagnoses Cylinder #2 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #3 CIRCUIT	P0353	Diagnoses Cylinder #3 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	 > 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	 >11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT	P0354	Diagnoses Cylinder #4 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the 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.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	 >11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

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 B	P0365	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	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	Test is Enabled = FALSE > 0.3 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	Test is Enabled	Continuous every 100 msec	
			No camshaft pulses received during 12 MEDRES events (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 3 >= 0 counts	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:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	
			The number of camshaft pulses received during 100 engine cycles	= 0 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled 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 B	P0366	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 6 pulses = region 3 >= 0 counts	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:	Test is Enabled CrankSensor_FA	Continuous, every MEDRES event unitl test completes, one test at every start attempt	Type A, 1 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled 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.
Intake Camshaft Profile Actuator 3 Control Circuit Open	P03EC	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 3 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 K Ω impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 3 Control Circuit Low Voltage	P03ED	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 3 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 3 Control Circuit High Voltage	P03EE	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 3 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 Q impedance between signal and controller power	Diagnositc is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 3 Performance	P03EF	An unintended pin firing without controller command. Intake Camshaft Profile 3	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 3 Pin Stuck	P03F0	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 3 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00) If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00, but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 3 Circuit Open	P03F1	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 3 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 K Ω impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 3 Circuit Low Voltage	P03F2	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 3 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 3 Circuit High Voltage	P03F3	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 3 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 3 Performance	P03F4	An unintended pin firing without controller command. Exhaust Camshaft Profile Actuator 3	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	> 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Catalyst System Low Efficiency Bank 1 - Three Way Catatlyst Passive	P0420	TWC PASSIVE CATALYST MONITOR ALGORITHM (Single bank inline engines only) The passive TWC diagnostic employs models of the pre-catalyst sensor performance, a chemical model of the catalyst performance and a model of the post-catalyst sensor performance. Each behavior is then estimated mathematically, with emphasis on an estimated oxygen storage capacity (OSC) as the indication of TWC health. Then, the actual exhaust constituent equivalence ratio measure is used by the model observer with kalman filtering to adjust the system models based on the error between the predictions and the actual measurement. In this way, the TWC passive diagnostic is not dependent on fuel-cut events, but rather adjusts frequently based on the variation of equivalence ratio	Modeled OSC Value (see TWC Passive OSC calculation tab)	< 20.00 milligrams	A) Core diagnostic is B) TWC Passive Observer diagnostic Enabled ? ---------------------------------- C) Post-catalyst Sensor Voltage Hi D) Post-catalyst Sensor Voltage Lo E) FuelCutoff F) Engine RPM G) Fuel Control Not Ready H) Exhaust Temp J) Post-catalyst 02 Sensor Not Ready K) "Green" Catalyst System Condition L) "Green" Post-catalyst 02 Sensor Condition --------------------------------- Following Fault Status Bundles must NOT be True: M) Pre-catalyst 02 Sensor N) Post-catalyst 02 Sensor P) Cam Phaser Status TFTKO Q) Cam Phaser Status FA R) Post-cat 02 Sensor	A) Enabled B) Check: Enabled ------------------------------ C) < 0.75 volts D) > 0.10 volts E) = False F) > 1,000.00 rpm G) = False H) > 450.00 degC J) = False K) = False L) = False -------------------------------- M) O2S_Bank_1_Sensor_1_FA N) O2S_Bank_1_Sensor_2_FA P) AnyCamPhaser_TFTKO Q) AnyCamPhaser_FA R) AIR System FA	Frequency: Passive Observer Measurements: 100 ms OSC Estimate Measurements: 100 ms Exhaust Temperature Estimate measurements: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		that occurs during normal driving. In order to promote robustness, limiting conditions qualify when the algorithm may actively adjust the model estimates by referencing air consumption per cylinder (APC), engine speed and fuel flow to form upper and lower bounds. As OSC is the indicator of catalyst health, a robust modelling strategy is applied where the composition of the exhaust gas going into the catalyst is estimated by using input from the wide-range pre-catalyst 02 sensor (EQR value) and the airflow rate. This estimate is decomposed into CO, C02, H20, H2 and 02 constituents. The chemical reaction is modelled through the catalyst, producing an estimated 02 storage value (OSV) plus an estimated 02 concentration exiting the catalyst. The post-catalyst 02 sensor response is modelled bv translatinq the			Performance diagnostic (POPD) Disabled for System Faults -------------------------------- TWO passive diagnostic valid measurement window achieved when: i) Accumulated exhaust flow is ii) EQR Transitions counts are	EECR_EngineArbitrated_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA Ethanol Composition Sensor FA TPS_ThrottleAuthorityDefaulted FULR_b_FuellnjCkt_FA FuelTrimSystemBI TFTK 0 FuelTrimSystemB2 TFTK 0 EngineMisfireDetected_FA EvapExcessPurgePsbl_FA FuelLevelDataFault AnyCamPhaser_FA AnyCamPhaser_TFTKO 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 ------------------------------ i) > 6,000.00 grams ii) > 20.00 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		estimated 02 concentration into a voltage signal. The post-catalyst sensor response estimate is then compared to the actual sensor measurement and the difference value (error) becomes the basis for the predictive observer to adjust the modelled estimates of the 3 stages. The adjustments, governed by Kalman filtering, yield an optimized Oxygen Storage Capacity estimate that is compared to the fault threshold when a sufficient data measurement window has been reached and then a diagnostic decision is produced.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) System Small Leak Detected (No ELCP - Conventional EVAP Diagnostic - with EAT using OAT Sensor - with Fuel Tank Zome Module (FTZM))	P0442	This DTC will detect a small leak (> 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as > 0.025", 0.030", or 0.150". The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (Please see **P0442 EONV Pressure Threshold (Pascals)** in Supporting Tables). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail). When EWMA is the DTC light is illuminated. The EWMA calculation uses a 0.13 weighting coefficient. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	> 0.60 (EWMA Fail Threshold), < 0.35 (EWMA Re-Pass Threshold)	Diagnostic is Enabled Fuel Level Drive Time Drive length (ECT OR OBD Coolant Enable Criteria Baro Distance since assembly plant Engine not run time before key off must be Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated Ambient Temperature (EAT) using OAT sensor at end of drive Conditions for Estimated	10 % < Percent < 90 % > 600 seconds > 5.0 miles > 63 °C = TRUE) > 70 kPa > 10.0 miles < refer to **P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature** in Supporting Tables. > 8 hours > 8 hours 0 °C<Temperature<35 °C	Once per trip, during hot soak (up to 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips EWMA Average run length is 8 to 12 trips under normal condition s Run length is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		the pressure drops (-62) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.			Ambient Temperature Using OAT Sensor to be Valid ***************************** 1. Startup OAT is less than previous trip EAT OR 2. Startup ECT - previous trip EAT OR 3. Engine off time OR 4. At startup, time since previous EAT valid and able to learn OR 5. EAT - current OAT OR 6. EAT < current OAT and speed timer and current OAT - EAT Speed timer increments at 100 msec rate and increments vary based on vehicle speed as follows: vehicle speed < 10mph 10 mph<speed< 35 mph 35mph<speed<124 124mph<speed< 124 Speed timer can never be less than 0 seconds ***************************** 1. High Fuel Volatility	***************************** < 0 °C > 7,200 seconds < 3,600 seconds 0 °C < difference < 2 °C > 240 seconds < 2 °C -0.2 seconds 0.10 seconds 0.20 seconds 0.20 seconds *****************************		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					During the volatility phase, pressure in the fuel tank is integrated vs. volatility time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. This value equates to an average integrated fuel tank pressure > 1,245 Pa. Please see **P0442 Volatility Time as a Function of Estimate of Ambient Temperature** in Supporting Tables. OR 2. Vacuum Refueling Detected See P0454 Fault Code for information on vacuum refueling algorithm. OR 3. Fuel Level Refueling Detected See P0464 Fault Code for information on fuel level refueling. OR 4. Vacuum Out of Range and No Refueling See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for	< -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					information on fuel level refueling. OR 5. Vacuum Out of Range and Refueling Detected See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR 6. Vent Valve Override Failed			
					Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test	0.50 seconds		
					OR 7. Key up during EONV test			
					No active DTCs:	MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA ModuleOffTime_FA AmbientAirDefault FuelLevelDataFault		
					No Active DTCs TFTKO	P0443 P0446 P0449 P0452 P0453 P0455		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P0458 P0459 P0498 P0499 P0496 P1001 P1005 P11FF P130F U18A2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM) (No ELCP - Conventional EVAP Diagnostic)	P0443	Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedance between output and controller ground.	Diagnostic is Enabled Powertrain relay voltage	Voltage > 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0458 may also set (Canister Purge Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Vent System Performance (No ELCP - Conventional EVAP Diagnostic - with purge pump - with Fuel Tank Zone Module (FTZM))	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This diagnostic runs with normal purge control and canister vent solenoid commanded open. The diagnostic fails when the FTP sensor vacuum measurement is above a vacuum threshold before it accumulates purge volume above a threshold. The diagnostic passes when it accumulates purge volume above a threshold before the FTP sensor vacuum measurement is above a vacuum threshold.	Vent Restriction Prep Test: Vented Vacuum for OR Vented Vacuum for Vent Restriction Test: Tank Vacuum for before Purge Volume After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.	< -623 Pa 60 seconds > 1,245 Pa 60 seconds > refer to **P0446 canister vent restriction test tank vacuum threshold** in Supporting Tables. Calibration threshold (Pa) for canister vent restriction as function (baro) 5 seconds > refer to **P0446 canister vent restriction test displaced purge volume limit** in Supporting Tables. Calibration threshold (liters) for canister vent restriction as function (baro)	Diagnostic is Enabled Fuel Level System Voltage Startup IAT Startup ECT Barometric Pressure P146C EVAP Purge Pump System Misassembled diagnostic is not running No active DTCs: No Active DTCs TFTKO	10 % < Percent < 90% > 10.0 volts 4 °C<Temperature<35 °C <35 °C >70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault EvapPurgeSolenoidCircuit_FA EvapVentSolenoidCircuit_FA FTP_SensorCircuit_FA PurgePumpDiag_FA Purge Pump LIN Communication Fault Active P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P1005 P11FF P130F U18A2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM) (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0449	Controller specific output driver circuit diagnoses the vent solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 200 K Q impedence between output and controller ground	Diagnostic is Enabled No active DTCs:	P1005 P130F U18A2	50 failures out of 63 samples 100 ms /sample	Type B, 2 Trips Note: In certain controllers P0498 may also set (Vent Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Pressure (FTP) Sensor Circuit Performance (No ELCP - Conventional EVAP Diagnostic)	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test. During the EONV test, the fuel tank vacuum sensor is re-zeroed. A re-zero occurs: 1) At the transition from the volatility phase to the pressure phase. 2) At the transition from the pressure phase to the vacuum phase. The re-zero test determines if the tank vacuum signal falls within a calibratable window about atmospheric pressure. If after some time, the tank vacuum signal does not fall to within the window, the re-zero test exits to the refueling rationality test. The refueling rationality test determines if a refueling event caused the re-zero problem. If so, the re-zero problem is ignored. If a refueling event is not	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is the DTC light is illuminated. The EWMA calculation uses a 0.20 weighting coefficient. The DTC light can be turned off if the EWMA is and stays below the	 0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold), <0.40 (EWMA Re-Pass Threshold)	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	Type A, 1 Trips EWMA Average run length: 6 Run length is 2 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		detected, then the results of the re-zero test are used to determine if there is a re-zero problem. 1) An individual re-zero test generates a re-zero ratio. The ratio goes from 0.0 to 1.0. 2) A 0.0 means that the re-zero pressure signal achieved exactly atmospheric pressure. 3) A ratio of 1.0 means that the re-zero pressure did not get within the window. 4) Re-zero pressure within the window generates values between 0.0 and 1.0. If a refueling event is not detected, then the resulting re-zero ratio is filtered using an exponentially weighted moving average (EWMA). When the EWMA exceeds a fail threshold, the vacuum re-zero test reports a failure. Once the vacuum re-zero test fails, the EWMA fall below a lower re-pass threshold before it can pass the vacuum re-zero test again.	EWMA fail threshold for 3 additional consecutive trips.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0452	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to a lower voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is below the lower voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P0452 DTC. A pass is reported for P0452 DTC if the low sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts (- -3736 Pa).	< 0.15 volts (3.0 % of Vref or -1,495 Pa)	No active DTC's:	P1001 P1005 U18A2	640 failures out of 800 samples 12.5 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 Tank Pressure (FTP) Sensor Circuit High Voltage (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0453	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to an upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is above the upper voltage threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for P0453 DTC. A pass is reported for P0453 DTC if the high sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (-1245 Pa) to 4.5 volts (- -3736 Pa).	> 4.85 volts (97.0 % of Vref or - -3,985 Pa)	No active DTCs:	P1001 P1005 U18A2	640 failures out of 800 samples 12.5 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 Tank Pressure (FTP) Sensor Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event. During the EONV test, an abrupt change in fuel tank vacuum is identified as a possible refueling event. If the abrupt change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts. If the refueling rationality test detects a refueling event, then the vacuum change is considered “rational.” If the refueling rationality test does not detect a refueling event, then the vacuum change is considered “irrational.” The vacuum change rationality diagnostic is an “X out of Y” test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds during a 600 second refueling rationality test.	> 112 Pa < 249 Pa >15 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 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.
		rationality test has an irrational result; the (X) fail counter is incremented. 3) If the (X) fail counter reaches the fail limit before the (Y) sample counter reaches the sample limit, the vacuum change rationality test fails. 4) If the (Y) sample counter reaches the limit before the (X) fail counter fails, the vacuum change rationality test passes.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission (EVAP) System Large Leak Detected (No ELCP - Conventional EVAP Diagnostic - with Purge Pump - with Fuel Tank Zone Module (FTZM))	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. This mode checks for large leaks and blockages when proper driving conditions are met. If these conditions are met, the diagnostic commands the vent valve closed and controls the purge duty cycle to allow purge flow to purge the fuel tank and canister system while monitoring the fuel tank vacuum level. The algorithm accumulates purge flow during the test to determine a displaced purge volume as the test proceeds. If the displaced purge volume reaches a threshold before the fuel tank vacuum level reaches its passing threshold, then a large leak failure is detected. On fuel systems with fuel caps If the first failure of	Purge volume while Tank vacuum After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.	> refer to **P0455 large leak diagnostic displaced purge volume threshold** in Supporting Tables. Calibration threshold (liters) for large leak diagnostic as function of barometric pressure (kPa) < refer to **P0455 large leak diagnostic tank vacuum threshold** in Supporting Tables. Calibration threshold (Pa) for large leak diagnostic as function of barometric pressure (kPa)	Diagnostic is Enabled Fuel Level System Voltage Barometric Pressure Purge Flow No active DTCs: No Active DTCs TFTKO If ECT > IAT, Startup	10 % < Percent < 90 % > 10.0 volts >70 kPa >3.00% MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault EvapPurgeSolenoidCircuit_FA EvapVentSolenoidCircuit_FA FTP_SensorCircuit_FA PurgePumpDiag_FA Purge Pump LIN Communication Fault Active P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited toO seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		P0455 occurred after a refueling event was detected and the MIL is off for P0455, the MIL will be commanded off after the first pass of P0455 is reported. If the first failure of P0455 did not occur after a refueling event was detected, the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.the MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported. On fuel systems without fuel caps The P0455 MIL will be commanded off on the ignition cycle after the third consecutive pass of P0455 is reported.	Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 1,993 Pa	temperature delta (ECT-IAT): Startup IAT Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	< 8 °C 4 °C<Temperature<35 °C <35 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Purge Control Valve Circuit Low (No ELCP - Conventional EVAP Diagnostic)	P0458	Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedence between output and controller ground	Diagnostic is Enabled Powertrain relay voltage	Voltage > 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0443 may also set (Canister Purge Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Purge Control Valve Circuit High (No ELCP - Conventional EVAP Diagnostic)	P0459	Controller specific output driver circuit diagnoses the canister purge solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedence between output and controller power	Diagnostic is Enabled Powertrain relay voltage	Voltage > 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Performance (For use on vehicles with two fuel senders and mechanical transfer pump)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	1) ****************************** Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long ****************************** Ia) If Deadband diagnostic subtest enabled Ib) If fuel volume in primary tank is Ic) and if fuel volume in secondary tank is Id) and if 1b and 1c indications do not change while fuel volume consumed by engine is OR 2) ****************************** Fuel consumed without a Primary Fuel Level Change ****************************** 2a) If indicated fuel volume change is 2b) while fuel consumed by the engine is	Ia) == Disabled status Ib) >1,024.0 liters Ic) <2.7 liters Id) > 18.0 liters 2a) < 3 liters 2b) > 24.4 liters	Ia) Diagnostic is Disabled Ib) Engine Operational State Ic) Device control state for the electric transfer pump 2a) Diagnostic is Enabled	Ib) == Running Ic) ==False	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit Low Voltage (For use on vehicles with a fuel float connected to an FTZM)	P0462	This DTC will detect a primary fuel tank sensor out-of-range low.	Fuel level Sender % of 5V range	<10%	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit High Voltage (For use on vehicles with a fuel float connected to an FTZM)	P0463	This DTC will detect a primary fuel tank level sensor out-of-range high.	Fuel level Sender % of 5V range	> 60 %	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 1 Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event. During the EONV test, a change in fuel level is identified as a possible refueling event. If the change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts. If the refueling rationality test detects a refueling event, the fuel level change is considered “rational.” If the refueling rationality test does not detect refueling, the fuel level change is considered “irrational.” The fuel level change rationality diagnostic is an “X out of Y” test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the rationality test has an	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, if a refueling event is not confirmed, then the test sample is considered failing which indicates an intermittent signal problem. An intermittent fuel level signal problem is defined as: The fuel level changes by and does not remain for 30 seconds during a 600 second refueling rationality test.	 >15% >15%	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 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.
		irrational result; the (X) fail counter is incremented. 3) If the (X) fail counter reaches the fail limit before the (Y) sample counter reaches the sample limit, the fuel level change rationality test fails. 4) If the (Y) sample counter reaches the limit before the (X) fail counter fails, the fuel level change rationality test passes.						

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 (DTCP135C) 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] >=700.00	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.
Evaporative Emission (EVAP) System Flow During Non-Purge (No ELCP - Conventional EVAP Diagnostic - with purge pump - with Fuel Tank Zone Module (FTZM))	P0496	This DTC will determine if the purge valve solenoid is leaking into the induction system or is leaking between the purge pump and purge valve solenoid. It does this by sealing the EVAP system (purge and vent valve closed) and then monitors fuel tank vacuum level. The fuel tank vacuum level should not increase. If tank vacuum increases above a threshold, a malfunction is indicated. Additional Information The purge valve leak diagnostic exists to helps service replace leaking purge valves that could otherwise be detected with the EONV small leak diagnostic (P0442).	Tank Vacuum	> refer to **P0496 purge valve leak diagnostic vacuum threshold** in Supporting Tables. Calibration threshold (Pa) for purge valve leak diagnostic as func (baro) as a function of barometric pressure (kPa)	Diagnostic is Enabled		Once per cold start Cold start: max time is 1,400 seconds	Type B, 2 Trips
					Fuel Level	10 % < Percent < 90 %		
					System Voltage	> 10.0 volts		
					Barometric pressure	>70 kPa		
					Startup IAT	4 °C<Temperature<35 °C		
					Startup ECT	<35 °C		
					Engine Off Time	>28,800.0 seconds		
			for	5 seconds	Initial purge pump pressure	>3.1 kPa		
			Test time	< refer to **P0496 purge valve leak test time as a function of fuel level and barometric pressure** in Supporting Tables. Test time only increments when engine vacuum > 10.0 kPa.	P146C EVAP Purge Pump System Misassembled diagnostic is not running Purge pump over tempertaure status is False			
					No active DTCs:	MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited FuelLevelDataFault EvapPurgeSolenoidCircuit_FA EvapVentSolenoidCircuit_FA FTP_SensorCircuit_FA PurgePumpDiag_FA Purge Pump LIN Communication Fault Active		
					No pending DTCs:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No Active DTC's TFTKO	Purge Pump LIN Communication Fault Pending P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Vent Solenoid Control Circuit Low (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0498	Controller specific output driver circuit diagnoses the vent solenoid low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 0.5 Q impedence between output and controller ground	Diagnostic is Enabled No active DTC's:	P1005 P130F U18A2	50 failures out of 63 samples 100 ms /sample	Type B, 2 Trips Note: In certain controllers P0449 may also set (Vent Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Evaporative Emission System Vent Solenoid Control Circuit High (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0499	Controller specific output driver circuit diagnoses the vent solenoid low sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. If the P0499 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 0.5 Q impedence between output and controller power	Diagnostic is Enabled No active DTC's:	P1005 P130F U18A2	50 failures out of 63 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.
Crankcase Ventilation System Disconnecte d	P04DB	The Crankcase Ventilation System Disconnected Diagnostic monitors the performance of the Positive Crankcase Ventilation (PCV) System. After the enable conditions are met, this monitor will will evaluate the signal of the Crankcase Ventilation Pressure sensor. This sensor is mounted in the PCV hose between the crankcase and the engine induction system. During normal operation, the sensor will see a pressure drop that varies in conjunction with the engine airflow. Additionally, the sensor will see pressure pulses as the cylinders go up and down in the crankcase. This monitor evaluates both the signal offset based on the pressure drop, and the signal noise based on the pressure pulses. The product of the	ScaledSignalLo * ScaledNoiseLo or ScaledSignalHi * ScaledNoiseHi Where ScaledSignalLo = Where ScaledNoiseLo = Where ScaledSignalHi =	< 1.20 kPa* kPa > 9,999.00 kPa * kPa Average Crankcase Ventilation Pressure Signal value calculated over the sample period and normalized as a function of engine air flow based on table **P04DB: Crankcase Pressure Signal Normalization for Air Flow, low case** 0.00 kPa is subtracted from the normalized value. The absolute value of the result is taken to get the final ScaledSignalLo. Average Crankcase Ventilation Pressure Signal delta calculated over the sample period and normalized as a function of engine speed based on table **P04DB: Crankcase Pressure Noise Normalization for Engine Speed, low case** Average Crankcase Ventilation Pressure	Diagnostic is Enabled Outside Air Temperature Engine Coolant Temperature Barometric Pressure <u>Stability conditions:</u> Engine Air Flow Engine Air Flow Engine Vacuum Engine Vacuum Engine Speed Engine Speed Maximum Engine Air Flow - Minimum Engine Air Flow over the sample period Engine Manifold Pressure (MAP) Transient Active MAP Transient Delay <u>MAP Transient Active</u> = TRUE when: Engine Speed Engine Speed MAP Delta over 100 msec <u>MAP Transient Delay</u> = TRUE for a period of time after MAP Transient Active becomes FALSE. This time is determined	>= -9.0 Degrees C >= 65.0 Degrees C >= 70.0 kPa >= 56.0 Grams/Second <= 77.0 Grams/Second >= -120.0 kPa <= -50.0 kPa >= 1,900 RPM <= 2,700 RPM <= 20.0 Grams/Second = FALSE = FALSE > 500 RPM < 2,300 RPM > MAP Transient Delta Threshold which is a function of engine speed based on table **P04DB: MAP Transient Delta Threshold**	The DTC will fail immediately if the malfunction criteria are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		signal offset and signal noise is compared to a calibration threshold during certain engine operating conditions. If this product is between two failure thresholds, the system is operating as expected, and the monitor passes. If the product is outside of the two failure thresholds, the system is disconnected, and the monitor fails.	Where ScaledNoiseHi = The Crankcase Ventilation Pressure Sensor is sampled every 3.125 msec to calculate ScaledSignalLo/Hi and ScaledNoiseLo/Hi. ScaledSignalLo/Hi and ScaledNoiseLo/Hi values are accumulated over a period of 0.5 Seconds.	Signal value calculated over the sample period and normalized as a function of engine air flow based on table **P04DB: Crankcase Pressure Signal Normalization for Air Flow, high case** 0.00 kPa is subtracted from the normalized value. The absolute value of the result is taken to get the final ScaledSignalHi. Average Crankcase Ventilation Pressure Signal delta calculated over the sample period and normalized as a function of engine speed based on table **P04DB: Crankcase Pressure Noise Normalization for Engine Speed, high case**	as a function of the maximum MAP Delta measured while MAP Transient Active = TRUE, and is based on table **P04DB: MAP Transient Delay Active Time** --------------------------- Time that stability conditions must be met prior to sampling data Data is sampled over a period of time Stability conditions must continue to be met as the data sample is collected. A data sample may accumulate data from multiple sample windows. <u>DTCs Active:</u> <u>DTCs Pending:</u>	------------------------------- = 0.5 Seconds = 0.5 Seconds MAF_SensorFA MAP_SensorFA OAT_PtEstFiltFA AmbPresDfltdStatus ECT_Sensor_FA PCV_Sensor_FA PCV_Sensor_Circuit_FA		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Low Engine Speed Idle System	P0506	This DTC 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 Filter coefficient	> 95.00 rpm 0.00375	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 70 kPa > 60 °C > 60 sec 32 > volts > 11 > 3 sec > 3 sec > -20 °C < 1.24 mph, 2kph < 25 rpm > 10 sec > 90.00 pct < 16.00 pct PTC not active Transfer Case not in 4WD LowState	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						Off-vehicle device control (service bay control) must not be active. 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 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	> 10 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	< -190.00 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	0.00375				
					Engine run time	> 60 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	> 90.00 pct		
					or Clutch Pedal Position	< 16.00 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_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 FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771		
					All of the above met	> 10 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.
Cold Start Rough Idle	P050D	Monitors the combustion performance when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that have less than complete combustion relative to the total number of engine cycles in which Dual Pulse is active.	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific vehicle. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. Incomplete combustion identified by P0300 threshold tables:	(>Idle SCDAND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)	Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements) OBD Manufacturer Enable Counter To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure AND NumCLOEvents In addition, Dual Pulse Strategy Is Enabled and Active Per the following: Engine Speed Accel Position Engine Run Time For the engine speeds and loads in which Dual	 = 0 < 400.00 degC > -12.00degC <= 66.00 degC >= 72.00 KPa < 1.00 >= 450.00 RPM <= 2,800.00 RPM Accel Position: <= 35.00 Pct Engine Run Time: < 100 seconds	Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: 100ms Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Pulse is active:			
					Dual Pulse Error induced misfires percentage	>= catalyst damaging misfire		
					Dual Pulse Error induced misfires percentage	< 90% of the maximum achieveable catalyst damaging misfire.		
					Engine Cycles	>= 80.00 <501		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature AND	>= 700.00 degC		
					Engine Run Time	>= 0.00 seconds		
					OR			
					Engine Run Time	> **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.		
					OR			
					Barometric Pressure	< 72.00 KPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Dual Pulse Strategy will exit per the following:			
					Engine Speed OR Accel Position	> 3,000.00 RPM > 40.00 Pct		
					Engine Run Time	>= 100 seconds		
					Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:			
					"Additional Dual Pulse Enabling Criteria":			
					Green Engine Enrichment	Not Enabled		
					Misfire Converter Protection strategy	Not being requested		
					Engine Metal Overtemp strategy	Not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Dynamic Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Injector Flow Test General Enable DTC's Not Set:	Not Active EngineMisfireDetected_FA AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit TFTK0 FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA FHPR b PumpCkt TFTK0 TransmissionEngagedState_FA EngineTorqueEstInaccurate FuelPumpRlyCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Performance - Continuously Variable Displacement Oil Pump	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure is compared against thresholds when engine is running and when engine is off.The engine oil pressure rationality diagnostic has two parts: engine running test and engine off test. The engine running test compares the measured oil pressure to threshold. If the measured oil pressure is out of the thresholds, then the error counter increments. The engine off test compares the measured oil pressure against thresholds after the engine has stopped rotating. If the measured oil pressure is out of the thresholds, then the error counter increments.	<u>To Fail when previously passing with the engine running:</u> Filtered Engine Oil Pressure below threshold OR Filtered Engine Oil Pressure above threshold <u>To pass when previously failing:</u> Filtered Engine Oil Pressure above low threshold plus an offset OR Filtered Engine Oil Pressure below high threshold minus an offset	Filtered Oil Pressure < (**P0521_CVDOP_MinOilPresFail** kPa) OR Filtered Oil Pressure > (**P0521_CVDOP_MaxOilPressure** kPa) Filtered Oil Pressure > (**P0521_CVDOP_MinOilPresFail** + 10.0 kPa) OR Filtered Oil Pressure < (**P0521_CVDOP_MaxOilPressure** - 10.0 kPa)	Variable Displacement Oil Pump is Present = TRUE Engine Running Diagnostic Status Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than **TimeForOilAeration** seconds) Filtered Engine Speed within range Sensed Oil Temperature within range Engine Speed stable No active DTC's	Enabled Enabled Test not report a fail state Yes >15.0 seconds >70.0 kPa FALSE 1,200 RPM < Filtered Engine Speed < 4,500 RPM 40.0 deg C < Sensed Oil Temperature <120.0 degC (RPM - Previous RPM) < 35 Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	> 40 errors out of 50 samples. Performed every 100 msec > 10passes out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Two Stage Oil Pump EOP Sensor Test with Engine Off If enabled: To Fail when previously passing with the engine off: Difference between oil pressure and Barometric pressure is Greater than a threshold OR Less than a threshold	 (Oil Pressure - Barometric Pressure) >-50.0 kPa OR <30.0 kPa	Two Stage Oil Pump is Present = TRUE Engine Off Rationality Test Diagnostic Status Engine Running Rationality Test Diagnostic Status Modelled Oil Temperature No Engine Movement No active DTC's	Enabled Enabled Test not report a fail state > 60.0 deg C > 10.0 seconds EngineModeNotRunTimer_FA EngOilTempFA EngOilPressureSensorCktFA CrankSensor_FA	> 20 errors out of 40 samples. Run once per trip	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low. This diagnostic compares the EOP circuit voltage to the reference voltage.	(Engine Oil Pressure Sensor Circuit Voltage) - 5 Volts) *100	< 5.00 percent Deadband: < 5 percent or > 95 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic Status	> 540 rpm < 490 rpm Yes Enabled	1,280 failures out of 1,600 samples Performed every 3.125 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
System Voltage Low	P0562	Detects a low 12V battery system. This diagnostic reports the DTC when battery voltage is low. Monitoring occurs when the engine speed is above a calibrated value.	System voltage low	Battery voltage <= 9.00	System voltage low diag enable = TRUE Run Crank voltage Engine speed >=	1.00 Voltage >5.00 volts 400.00	400 failures out of 500 samples 12.5 ms /sample	Type C, 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.
System Voltage High	P0563	Detects a high 12V battery system. This diagnostic reports the DTC when battery voltage is high.	System voltage high	Battery voltage >= 18.00	System voltage high diag enable = TRUE Run Crank voltage	1.00 Voltage >5.00 volts	400 failures out of 500 samples 12.5 ms /sample	Type C, 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.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range. "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in an invalid range, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585-0.615 0.78-0.81, 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control On Switch Circuit	P0565	Detects a failure of the cruise on/off switch in a continously applied state "Emissions Neutral Default Action - When the BCM tells the ECM that the cruise control analog input voltage is in the Momentary Cruise On/Off range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control On switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Resume range for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Resume switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Set range for too long, the code is set and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Set switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Cancel Switch Circuit	P056C	Detects a failure of the cruise cancel switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise control analog input voltage is in the Cancel range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	Cruise Control Cancel switch remains applied for greater than a calibratable period of time.	fail continously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Range/ Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	.Brake pedal position sensor movement diagnostic cal is enabled 1.00	True	Diagnostic is enabled. Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00 ignition voltage > 10.00		MIL: Type A, 1 Trips
			Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 3.85 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table **P057B KtBRKI_K_CmpltTestPointweight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic ouput for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	17.88	Diagnostic is enabled. Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	5.00/ 20.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit voltage is too low for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control analog circuit voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "open short to ground when the ratio is measured in the following rangs: 0-0.185	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-function Circuit High Voltage	P0581	detects short to power failure for cruise multi-function switch circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch circuit voltage is too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for vehicles with a momentary on/off cruise switch architecture.	Cruise Control analog circuit voltage must be in "Short To Power" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit	P0589	Detect when cruise control multi-function switch circuit B (analog) voltage is in an illegal range "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit is detected Out of Range for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585-0.615, 0.78-0.81, 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit Low	P0592	detects short to ground failure for cruise multi-function switch circuit B. "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit is detected too low for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control Circuit B analog voltage A/D count ratio is considered to be "open short to groun"d when the ratio is measured in the following rangs: 0-0.185	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, 1 Trip No MIL Emissions Neutral ."Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Multi-Function Input B Circuit High	P0593	detects short to power failure for cruise multi-function switch circuit B "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch for the secondary cruise switch circuit is detected too high for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with a secondary cruise switch circuit.	Cruise Control analog circuit B voltage must be in a "Short To Power" range for greater than a calibratable period of time.	The cruise control Circuit B analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005- 1.035	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, 1 Trip No MIL Emissions Neutral, "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	A2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. A Part 1 failure result then enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position. Retry attempts will continue until the commanded position is achieved or the trip ends.	[Smart Shutter Actuator 1 Position Response **OR** Shutters Not Initialized **OR** The absolute difference between Smart Shutter Actuator 1 Position Response and Shutter response and Commanded Position percent] **AND** Shutter 1 Diagnostic Delay Threshold count	[Indeterminate **OR** = TRUE **OR** > 5.00] **AND** Counter > 109.00 counts	a. Command ShutterI Enable. b. ShutterI Performance Diagnostic Enabled c. Off Vehicle Communication Service Request Diagnostic Enabled Any of the following conditions are met: d. Run Crank Active All of the following conditions are met: e. Run Crank Active f. Command On and Key Off g. ECU Awake h. Run Crank Voltage in Range i. Ignition Powertrain Relay Voltage in Range j. Actuator Initialization Complete Any of the following conditions are met k. If Enabled, performance diagnostics will be enabled even in the	a. = TRUE b. = Enabled c. = TRUE d. =TRUE e. = FALSE f. =TRUE g. =TRUE h. >=11.00 AND <= 32.00 i. >= 11.00 AND <= 32.00 j. =TRUE k. = Disabled	0.1 seconds out of a 0.1 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.
					presence of a communication fault. All of the following conditions are met: l. LIN communication NOT faulted.(DTC: U028400, U058500) m. No LIN communication Fault Pending n. LIN communication Data is Ready	l. = TRUE m. =TRUE n. =TRUE		
			Shutter 1 Performance Test count	= 5.00 counts	a. Command ShutterI Enable. b. ShutterI Performance Diagnostic Enabled c. Off Vehicle Communication Service Request Diagnostic Enabled Any of the following conditions are met: d. Run Crank Active All of the following conditions are met: e. Run Crank Active f. Command On and Key Off	a. = TRUE b. = Enabled c. = TRUE d. =TRUE e. = FALSE f. =TRUE	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					g. ECU Awake	g. = TRUE		
					h. Run Crank Voltage in Range	h. >=11.00 AND <= 32.00		
					i. Ignition Powertrain Relay Voltage in Range	i. >= 11.00 AND <=32.00		
					j. Actuator Initialization Complete	j. =TRUE		
					Any of the following conditions are met			
					k. If Enabled, performance diagnostics will be enabled even in the presence of a communication fault.	k. = Disabled		
					All of the following conditions are met:			
					l. LIN communication NOT faulted.(DTC: U028400, U058500)	l. = TRUE		
					m. No LIN communication Fault Pending	m. =TRUE		
					n. LIN communication Data is Ready	n. =TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft System Cold Start Performance - Bank 1	P05CC	Detects a VVT system error during Cold Starts by comparing the desired and actual cam positions when WT is activated. This is the same type diagnostic as P0011 except this detects excessive deviations of position while the cold start phaser positions are being commanded.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	Cam Position Error > 6.00 deg.	Diagnositc is Enabled **Intake Cam Phsr Enable** System Voltage Engine Running Power Take Off (PTO) active **Catalyst Warmup Enabled** Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	 '=TRUE > 11.00 Volts = TRUE = FALSE = TRUE > 0 deg > 6.00 deg AND < 26.00 deg < 3.00 deg for (**P0011_P05CC_StablePositionTimeId**) seconds P0010 P2088 P2089	65 failures out of 75 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 Camshaft System Cold Start Performance - Bank 1	P05CE	Detects a VVT system error during Cold Starts by comparing the desired and actual cam positions when WT is activated. This is the same type diagnostic as P0014 except this detects excessive deviations of position while the cold start phaser positions are being commanded.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	Cam Position Error > 6.00 deg.	Diagnostic is Enabled		65 failures out of 75 samples 100 ms /sample	Type B, 2 Trips
					Exhaust Cam Phsr Enable	= TRUE		
					System Voltage	> 11.00 volts		
					Engine Running	= TRUE		
					Power Take Off (PTO) active	= FALSE		
					Catalyst Warmup Enabled	= TRUE		
					Desired cam position	> 0 deg		
					Desired AND Measured cam position	> 6.00 deg AND < 32.00 deg		
					Desired cam position variation	<3.00 deg for (**P0014_P05CE_StablePositionTimeEd**) sec		
					No Active DTCs	P0013 P2090 P2091		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Time new seed not received exceeded			always running	450 milliseconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	3 / 18 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test is Enabled: 1 (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	3.00		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is Enabled: 1 (If 0, this test is disabled)	5 / 10 counts or 150 milliseconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization.	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Counter >=					
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 0 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: **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: **P0606 PFM Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main orocessor	

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Main Processor Performance (Gasoline applications ONLY)	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.	Equivance Ratio torque compensation exceeds threshold	-66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	66.00 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.
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	93.73 mg	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	15.00 degrees		Engine speed >0rpm	Up/down timer 425 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00	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.
				Nm				
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 650 rpm	Up/down timer 448 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 1,070.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 1,070.00 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	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	66.00 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.
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 8,191.88 or 8,191.88 rpm (hysteresis pair)	Up/down timer 148 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			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 475 ms continuous, 0.5 down time multipier	
			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 475 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 448 ms continuous, 0.5 down time multipier	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). **P060C_Speed Control External Load f(Oil Temp, RPM) +** 66.00	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.
				Nm				
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	65.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	65.00 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.
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 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	
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 0.00 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.
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	15.00 degrees	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.
			1. Cylinder Torque Offset exceeds step size threshold OR 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 66.00 Nm 2. 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 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.
			Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold	0 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 calculation plus threshold	66.00 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.
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than Orpm	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P060C_Speed Control External Load f(Oil Temp, RPM) +** 66.00 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.
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P060C_Speed Control External Load f(Oil Temp, RPM) +** 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1,070.00 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	1,070.00 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.
			Commanded Immediate Request is greater than its redundant calculation plus threshold OR Commanded Immediate Request is less than its redundant calculation minus threshold	1,070.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 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 2,048 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and	40.13 Nm		Cruise has been engaged for more than 4.00	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.
			Cruise Axle Torque Request exceeds threshold			seconds	0.5 down time multipier	
			Desired engine torque request greater than redundant calculation plus threshold	65.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine min capacity above threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 108 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	15.00 Degree		Engine speed greater than Orpm	Up/down timer 425 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.
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	2.76 m/s	Ignition State	Accessory, run or crank	Up/down timer 148 ms continuous, 0.5 down time multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 148 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store	N/A	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.
			do not match				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 348 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	8.48 percent	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	0.06 kpa	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.
			Throttle desired torque above desired torque plus threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 66.00 Nm Low Threshold -66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0000429 Low Threshold -0.0000429	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.
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 66.00 Nm Low Threshold -66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 66.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is	High Threshold	Ignition State	Accessory, run or crank	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			greater than commanded by AC control software or less than threshold limit	39.00 Nm Low Threshold 0.00 Nm			475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 66.00 Nm Low Threshold -66.00 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.
			Generator friction torque is out of bounds given by threshold range	High Threshold 66.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between the Supercharger friction torque and its redundant calculation greater than threshold	66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy do not match	High Threshold 66.00 Nm Low Threshold -66.00 Nm Rate of change threshold		Engine speed >0rpm MAF, MAP and Baro DTCs are false	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.
				4.13 Nm/loop				
			Torque error compensation is out of bounds given by threshold range	High Threshold 66.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 6.60 Nm Low Threshold 0.00 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.
			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	1.65.00 Nm 2. N/A 3.65.00 Nm 4.65.00 Nm	3. &4.: Ignition State	1. &2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 66.00 Nm 3. &4.: Accessory, run or crank	Up/down timer 475 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 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the	Table. ffDesired		Enoine soeed >0rom	Uo/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Engine Torque). See supporting tables: **P060C_Delta MAP Threshold f(Desired Engine Torque)**			148 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 redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	1,070.00 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.
			Cold Delta Friction Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM). See supporting tables: **Speed Control External Load f(Oil Temp, RPM) +** 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			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	
			Steady State Estimated	N/A		AFM not changing from	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Engine Torque and its dual store are not equal			Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	2,048 ms continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 10.00 s	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 148 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by	15.00 degrees		Engine speed >0rpm	Up/down timer 425 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			threshold range				down time multipier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	66.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	66.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	15.00 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 66.00 Nm	Up/down timer 448 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.
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	66 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms		Engine speed > 650 rpm	Up/down timer 448 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	40.13 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 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	
			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 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	1. 5.00 % 2. N/A 3. 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.
			Commanded axle torque is greater than its redundant calculation by threshold	1,070.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	1,605.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 148 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software	39.00 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.
			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	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold	15.00 degrees		Engine speed >0rpm	Up/down timer 148 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	
			Absolute difference of the predicted motor torque ACS and its redundant cacluation is greater than a threshold	0.01 Nm			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.
			Absolute difference of maximum throttle area and its redundant cacluation is greater than a threshold	15 mm2			Up/down timer 148 ms continuous, 0.5 down time multipier	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Throttle learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired Throttle Position and its redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference between Estimated Engine Torque and Commanded Engine Torque is greater than an offset -OR- Difference between Engine Torque Control Feedback and its redundant feedback calculation are beyond its safety bounds	66.00 Nm Greater than 66.00 Nm or Lower than 66.00 Nm	Engine State	Running	Up/down timer 200.00 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- Immediate Feedback Control is active beyond allowed -OR- Torque Control MPC Failure is active	 2.00 seconds				
			Calculated or Commanded Engine to Axle ratio is lower than a threshold -OR- Engine to Axle Offset is greater than a threshold	0.9 66.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175.00 ms continuous, 0.5 down time multipier	
			Difference between Cruise Arbritration Request and its redundant calcultion exceeds a threshold -OR- Difference between Cruise Accleration Request and its redundant calcultion exceeds a threshold	40.13Nm 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 Axle Torque and its redundant calcultion is greater than a threshold -OR-	1,070.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,047.97 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Difference between commanded Axle Torque and its redundant calcultion is less than a threshold	1,605.00 Nm				

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Starter Relay Control Circuit High Voltage (12VSS)	P0617	Controller specific output driver circuit diagnoses the Starter relay low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Starter control diag enable Engine speed Run Crank voltage	Enabled >=0.00RPM >=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 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.
Fuel Pump Relay Control Circuit Open	P0627	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay 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.	Run/Crank Voltage	Voltage 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P0629 may also set (Fuel Pump Relay Control Short to Power)

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC determines the internal fuel injctor control module circuit is faulted. The faulted status is set on any failure that could potentially damage the drivers or injectors, or could result in uncontrolled fueling. The following general classes of failures shall be covered: Communication error with control circuit Internal corruption of control circuit values, Invalid interface values (from control circuit)	Internal ECU Boost Voltage OR Internal ECU Boost Voltage OR Driver Status OR Driver Status	>= 90 Volts <= 40 Volts = Not Ready = Uninitialized	Battery Voltage	>= 8 or >= 11 Enabled when a code clear is not active or not exiting device control Engine is not cranking Powertrain Relay Voltage within range	High Voltage - 160 failures out of 200 samples Low Voltage - 160 failures out of 200 samples Driver Status Not Ready- 160 failures out of 200 samples Driver Status Uninitialized - Uninitialized state for >= 100 counts All at 12.5ms per sample	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module 02 Sensor Processor Performance Bank 1) (For use with WRAF	P064D	Diagnoses the WRAF Application-Specific Integrated Circuit (ASIC) for Controller Status and Measure Valid faults. These faults can impact closed loop fuel control. This DTC when enabled, monitors the two different failure counters it receives from the WRAF ASIC. The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the two individual fail and sample counters.	B1S1 WRAF ASIC indicates control module faults	Controller Status fail counts and Measure Valid fail counts are accumulated to determine fault status	Diagnostic is Enabled Engine Run or Auto stop Heater Warm-up delay WRAF circuit diagnostic delay since power up	 = True = Complete > 20.0 sec	128 controller status fail counts out of 160 samples OR 128 measure valid fail counts out of 160 samples 25 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.
Unauthorized Software Calibration Detected	P064F	This DTC indicates that the ECU software has an invalid MACT (Message Authentication Code Table)	The MACT embedded in the ECU software is invalid	Invalid MACT	Calibration enable	= 1 Boolean	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.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2 by monitoring the reference percent Vref2 and failing the diagnostic when the percent Vref2 is too low or too high or if the delta between the filtered percent Vref2 and non-filtered percent Vref2 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref2 < or ECM percent Vref2 > or the difference between ECM filtered percent Vref2 and percent Vref2 > (100% corresponds to 5.5 Volt)	88.64 % Vref2 93.18% Vref2 0.90 % Vref2	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 >6.41 Volts = 25.00 Seconds = FALSE >8.41 Volts = TRUE	19/39 counts; or 187.5000 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 0 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 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Torque Managment System - Forced Engine Shutdown	P06AF	This diagnostic is monitoring that the TCM is processing code correctly. The TCM computes the correct pattern sent via a CAN message to the monitoring ECM. When the ECM does not receive a correct pattern or a missing pattern to the monitoring ECM, the DTC is set.	Received pattern from the TCM OR Received malfunction pattern	# expected pattern >= 2 counts	Run or Crank Run Crank Active Time	 >= 500 milliseconds	6/12 counts or 2,000 milliseconds continuous; 25 ms/count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit (sensor #1) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds.	FFT Diagnostic Output	**> P06B6_P06B7_OpenTestCktThrshMin** **AND** **< P06B6_P06B7_OpenTestCktThrshMax** **See Supporting Tables**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 0.0 seconds > 650 RPM and < 4,250 RPM > 161 Revs > 10 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0150 Updated each engine event	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 Knock Sensor Processor 2 Performance	P06B7	This diagnostic checks for a fault with the internal test circuit (sensor #2) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds.	Individual Sensor Threshold Enabled? FFT Diagnostic Output	1.00, Use Case 2 **Case 1:** **> P06B6_P06B7_OpenTestCktThrshMin** **AND** < **P06B6_P06B7_OpenTestCktThrshMax** **See Supporting Tables** **Case 2:** > **P06B7_OpenTestCktMin2** **AND** < **P06B7_OpenTestCktMax2** **See Supporting Tables**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes > 0.0 seconds > 650 RPM and < 4,250 RPM > 161 Revs > 10 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient **Case 1 Weight Coefficient =** 0.0150 Updated each engine event **Case 2 Weight Coefficient =** 0.0150 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit/Open	P06DA	Controller specific output driver circuit diagnoses the oil pump low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit > 200 k Q impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controllers P06DB may also set (Engine Oil Pressure Control Circuit Short To Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit Low	P06DB	Controller specific output driver circuit diagnoses the oil pump low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit < 0.5 0 impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controllers P06DA may also set (Engine Oil Pressure Control Circuit Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Pressure Control Circuit High	P06DC	Controller specific output driver circuit diagnoses the oil pump low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to Power < 0.5 Q impedance between output and controller power	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips

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

Oil Pump Control Circuit Performance - Continuously Variable Displacement Oil Pump	P06DD	Diagnoses the performance of the oil pump controls. The test determines if the oil pump is capable of meeting the pressure demand.	Absolute Oil Pressure Error =
			
			ABS [Desired Oil Pressure - Measured Oil Pressure]
			
			A rate limiter is applied to the absolute error value
			
			Rate limited pressure error=
			if ((Absolute Oil Pressure Error - Previous Absolute Oil Pressure Error) > <KeLUBC_dp_DiagPresErrRtLim>) {
			
			Rate Limited Pressure Error = <KeLUBC_dp_DiagPresErrRtLim> + Previous Absolute Oil Pressure Error;
			
			}else{
			
			Rate Limited Pressure Error Variation = Absolute Oil Pressure Error;
			
			}
			
			A first-order lag filter is applied to the Rate Limited Pressure Error value, every 100ms:
			
			Filtered Pressure Error = Previous Error + 0.00400 *(New Error - Previous
				Rate limited filtered Pressure Error > 35.00 kPa
				
				AND
				
				Cycler Algorithm has cycled the pump solenoid for 4.50 seconds
				
				AND
				
				Filtered Pressure Error > **P06DD_CVDOP_MaxPressErr** after the cycler is complete
					<u>Common Criteria:</u>
					
					Diagnosis enabled
					
					Closed Loop Pump Control Active
					
					Engine Running
					
					Powertrain Relay Voltage
					
					Desired Oil Pressure in Range
					
					Oil Temperature in Range
					
					Engine Speed in Range
						<KeLUBC_b_DiagEnable>
						TRUE
						
						> 15.0 seconds
						
						> 11.00
						
						P06DD_CVDOP_MinDesPres < Desired Oil Pressure < **P06DD_CVDOP_MaxDesPress**
						
						40.00 °C < Oil Temp < 120.00 °C
						
						1,200 RPM <= Engine Speed <= 4,500
							Performed every 100ms.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Error) <u>Fail from passing state:</u> Filtered Oil Pressure Error is greater than a threshold AND the cycler algorithm is unable to clear the fault. <u>Pass from failing state:</u> Filtered Oil Pressure Error is less than a threshold	Filtered Pressure Error < **P06DD_CVDOP_Max PressErr**				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Unable to Engage Neutral	P073D	Detects the inability to achieve or remain in Neutral.	Actual Arbitrated Transmission Range	≠Neutral	Actual Transmission Range Commanded Transmission Range AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= Good value = Neutral =False =False =True = True =True =Park =False	10,000.00 msec from Park 10,000.00 msec from Reverse 10,000.00 msec from Drive	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	≠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	10,000.00 msec from Park 3,600,000.00 msec from Neutral* 3,600,000.00 msec from Drive* internal does not diagnose from N&D	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 LowCorrelation diagnostic compares the two switches behind the Park pushbutton	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	#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	10,000.00 msec from Reverse 10,000.00 msec from Neutral 10,000.00 msec from Drive	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	#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	10,000.00 msec from Park 10,000.00 msec from Reverse 10,000.00 msec from Neutral	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 AlphaI on Sensor 1 OR percentages disagree	Outside shifter path of movement >= 0.00 %	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 OR = 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 >= 0.00 %	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 >= 0.00 %	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 >= 0.00 %	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 SensorA 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 6.25 ms loop for > 160 loops in 6.25 ms loop >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 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 6.25 ms loop >= 6.60 Volts	16 failed samples out of 32 samples in 6.25 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 SensorA 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	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
DC/DC Converter Voltage SensorA 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	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 6.25 ms loop for > 160 loops in 6.25 ms loop >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 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 6.25 ms loop >= 6.60 Volts	16 failed samples out of 32 samples in 6.25 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	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

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

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

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

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

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Wastegate Actuator "A" Control Circuit Shorted	P103A	Controller specific output driver circuit diagnostic, diagnosing for the 'electric waste gate actuator A actuator' H-bridge driver load short failure. In series applications, turbocharger 'A is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver on state indicates a load short failure.	< 0.5 Q impedance between motor output A and motor output B	Diagnostic enabled ***************************** Powertrain relay voltage ***************************** Engine does not crank Diagnostic system not disabled	True ***************************** >=11.0 Volts *****************************	10 failures out of 12 samples 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.
02 Sensor Heater Supply Voltage Sense Circuit Range/ Performance	P103B	The P103B diagnostic determines if the heater supply circuit is rational by comparing the heater supply voltage to the run crank voltage and calculating the difference. The heater supply voltage input is connected to the 02 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the 02 heaters. The 02 heater voltage is used by the HWIO to calculate the 02 heater resistance on switching type 02 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage. The diagnostic failure counter is incremented if the voltage difference is greater than the threshold. This DTC is set based on the fail and sample counters.	The absolute value of Heater Supply Voltage delta from Run Crank voltage	> 2.00 volts	Diagnostic is Enabled Powertrain relay in range (Relay in range is defined as relay voltage Run Crank signal active	= True > 11.00 volts) = True (Please see **"Run/Crank Active conditions"** in Supporting Tables)	8 failures out of 10 samples 250 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.
02 Sensor Heater Supply Voltage Sense Circuit Low	P103C	The P103C diagnostic determines if the heater supply circuit is low by comparing the heater supply voltage to the threshold. The heater supply voltage input is connected to the 02 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the 02 heaters. The 02 heater voltage is used by the HWIO to calculate the 02 heater resistance on switching type 02 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage. The diagnostic failure counter is incremented if the heater supply voltage is less than the threshold. This DTC is set based on the fail and sample counters.	Heater Supply Voltage	< 6.00 volts	Diagnostic is Enabled Powertrain relay in range (Relay in range is defined as relay voltage Run Crank signal active	 = True > 11.00 volts) = True (Please see **"Run/Crank Active conditions"** in Supporting Tables)	8 failures out of 10 samples 250 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.
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 <-11.00 degrees >314.50 degrees <304.50 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 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.
Cylinder 1 Injection Pulse Performance	P10A3	Diagnostic to determine if injection pulse total compensation for cylinder 1 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Pulse Performance	P10A4	Diagnostic to determine if injection pulse total compensation for cylinder 1 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4 P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A5	Diagnostic to determine if injection pulse total compensation for cylinder 2 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A6	Diagnostic to determine if injection pulse total compensation for cylinder 2 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4 P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A7	Diagnostic to determine if injection pulse total compensation for cylinder 3 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A8	Diagnostic to determine if injection pulse total compensation for cylinder 3 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4 P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10A9	Diagnostic to determine if injection pulse total compensation for cylinder 4 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< **P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P10AA	Diagnostic to determine if injection pulse total compensation for cylinder 4 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> **P10A4 P10A6 P10A8 P10AAP10AC P10AE P10B0 P10B2- Maximum Small Pulse Compensation Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor AZ C Correlation	P10BC	Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range. With this monitor, the BARO sensor is compared to a redundant sensor called BARO C. If the BARO sensor value is not similar to the BARO C sensor value, then the BARO Sensor A/C Correlation diagnostic will fail.	Difference between BARO A Sensor reading and BARO C Sensor reading	> 15.0 kPa	Diagnostic is Enabled LIN communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Press Regulator Solenoid Control Circuit Short	P10E8	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to low side 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.	<= 1.1 or 15 Amps selectable thershold based on High pressure Pump.	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 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.
Inlet Airflow System Performance (single turbo)	P1101	Detects a performance failure in the Manifold Pressure (MAP) sensor, Turbocharger Boost Pressure sensor, Throttle Position sensor (TPS) or Mass Air Flow (MAF) sensor that cannot be uniquely identified as a failure in one individual sensor. This diagnostic can set when more than one of these sensors has a performance concern. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these four sensors. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with	See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow - Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP - MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP - MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP - MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP -	> 20.0 grams/sec > 25.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 250 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Powertrain Relay Voltage for a period of time Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 130 Deg C = FALSE) -20 Deg C <= 100 Deg C >= 9.1 Volts >= 0.2 Seconds >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		the system, but no single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.	measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101:TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow	> 30.0 kPa > 30.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow**	No Active DTCs:	**P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND Manifold Pressure AND Filtered Mass Air Flow - Mass Air Flow Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	> a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP** < 3.0 gm/sec < a threshold in gm sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow** < a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP** < 3.0 gm/sec	No Pending DTCs: Diagnostic is Enabled	AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT SIDI High Pressure Rail Temperature Sensor Performance	P111F	This DTC Diagnoses Fuel Temperature sensors rationality by comparing Primary sensor (T1) vs. Secondary sensor (T2)	Fuel Temperature Error (Absolute delta between sensori and sensor2)	> 20.00 degC	Fuel Temperature Rationality Diagnostic Enabled	True	100.00 failures out of 125.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
						Enabled when a code clear is not active or not exiting device control		
						Temperature sensors 1 out of range Low or High Fault Active (P0182, P0182)		
					No Fault Active on	Temperature sensors 2 out of range Low or High (P0187, P0188)		
						SENT Communication Fault Active (U0625, U101B, U0670, U0671)		
						SENT Intenal Error Fault Active (P126E, P126F)		
						Fuel Temperature Sensor SENT Message Error Fault Active (P128C, P128D)		
					No Fault Pending on	SENT Communication Fault Pending (U0625, U101B, U0670, U0671)		
						Fuel Temperature Sensor SENT Message Error Fault Pending (P128C, P128D)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module 5V Reference 1 Circuit	P1176	This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 1 Circuit.	Raw Fuel Pump Driver Control Module 5V Reference 1 is or Raw Fuel Pump Driver Control Module 5V Reference 1 is or Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 1 and Raw Fuel Pump Driver Control Module 5V Reference 1 is For a non-continuous failure of out of For a continuous failure of	>92.25 Percent <87.75 Percent > 99.00 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage PT Sensor Bus Relay The following DTCs that diagnose the message that contains the FPDCM/ FTZM reference circuit data are not active: P165C U0076 U18A2	Enabled >=11.00 Volts Commanded on (if present)	Samples every 6.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module 5V Reference 2 Circuit	P1177	This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 2 Circuit.	Raw Fuel Pump Driver Control Module 5V Reference 2 is or Raw Fuel Pump Driver Control Module 5V Reference 2 is or Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 2 and Raw Fuel Pump Driver Control Module 5V Reference 2 is For a non-continuous failure of out of For a continuous failure of	>92.25 Percent <87.75 Percent > 99.00 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage PT Sensor Bus Relay The following DTCs that diagnose the message that contains the FPDCM/ FTZM reference circuit data are not active: P165C U0076 U18A2	Enabled >=11.00 Volts Commanded on (if present)	Samples every 6.00 milliseconds.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	P1179	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is or Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is or Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is For a non-continuous failure of out of For a continuous failure of	>92.25 Percent <87.75 Percent > 99.00 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage PT Sensor Bus Relay The following DTCs that diagnose the message that contains the FPDCM/ FTZM reference circuit data are not active: P1200 U0076 U18A2	Enabled >=11.00 Volts Commanded on (if present)	Samples every 250.00 milliseconds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 low side circuit shorted to high side circuit	P1248	Controller specific output driver circuit diagnoses injector 1 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	 25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 low side circuit shorted to high side circuit	P1249	Controller specific output driver circuit diagnoses injector 2 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Injector3 low side circuit shorted to high side circuit	P124A	Controller specific output driver circuit diagnoses injector 3 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 low side circuit shorted to high side circuit	P124B	Controller specific output driver circuit diagnoses injector 4 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions. The FTZM ERFS control may adjust the PWM slew rate or frequency as a self-protection method, but may not reduce pump rotational speed or impact pumping performance in any way due to an over-temperature condition.	Fuel Pump Driver Temperature	T > 160 degC	a) Diagnostic is .. b) Sensor Bus Relay On c) CAN Sensor Bus message $3EC_Available d) Sensor Bus Message $3EC Temp Signal Message Counter Incorrect [CFMR_b_FTZM_Info7_ARC_ChkErr]	a) Enabled b) == TRUE c) == TRUE d) <> TRUE	5.00 failures/ 10.00 samples 1 sample / 100 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 1 Internal Fault - Error Code	P126E	This DTC Diagnoses the SENT Fuel Temperature Sensor 1 internal failure	Fuel Temperature Sensor 1 SENT digital read value	>= 4,089.00	No Fault Active on	Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (U0625, U101B, U0670, U0671) Fuel Temperature Sensor SENT Message Error Fault Active (P128C)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
					No Fault Pending on	Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Temperature Sensor 2 Internal Fault - Error Code	P126F	This DTC Diagnoses the SENT Fuel Temperature Sensor 2 internal failure	Fuel Temperature Sensor 2 SENT digital read value	>= 4,089.00			50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips
					No Fault Active on	Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (U0625, U101B, U0670, U0671) Fuel Temperature Sensor SENT Message Error Fault Active (P128D)		
					No Fault Pending on	Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail High Pressure Sensor 2 Out of Range	P127C	This DTC diagnose SENT high pressure sensor 2 that is too low out of range. If the sensor digital value (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	High Pressure Rail Sensor 2 SENT digital read value	=< 66			Time Based: 400 Failuer out of 500 Samples 6.25 ms per 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.
SENT Fuel Rail Pressure Sensor 1 Internal Performance	P128A	This DTC determines if there is internal error within the SENT pressure sensor 1 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU.	Digital pressure sesnor 1 value	>= 4,089	 SENT Fuel Rail Pressure Sensor Internal Performance Enable No Fault Pending	Enabled when a code clear is not active or not exiting device control True U0625 P16E5 P128F	400 failures out of 500 samples 6.25 ms per 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.
SENT Fuel Rail Pressure Sensor 2 Internal Performance	P128B	This DTC determines if there is internal error within the SENT pressure sensor 2 (i.e. Broken wire bond internal to the SENT Sensor). Once the internal error is detected a fixed faulted digital values is communicated to the ECU.	Digital pressure sesnor 2 value	>= 4,089		Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples	Type A, 1 Trips
					SENT Fuel Rail Pressure Sensor Internal Performance Enable	True	6.25 ms per Sample Continuous	
					No Fault Pending	U0625 P16E5 P128F		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SENT Fuel Rail Pressure &Temperature Sensor Temperature 1 Message Incorrect	P128C	This DTC diagnoses the the communication errors on the temperature 1 serial data channel	Serial Message 1 Age	>= 0.03 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >=0.00 seconds U0625 P16E5	134 failures out of 167 samples 6.25 ms per 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.
SENT Fuel Rail Pressure & Temperature Sensor Temperature 2 Message Incorrect	P128D	This DTC diagnoses the the communication errors on the temperature 2 serial data channel	Serial Message 2 Age	>= 0.03 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >=0.00 seconds U0625 P16E5	134 failures out of 167 samples 6.25 ms per 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.
SENT Fuel Rail Pressure & Temperature Sensor Pressure Message Incorrect	P128F	This DTC determines if there is any SENT signal waveform for discrepancies (i.e. too many pulse, too few pulse, clock shift). The SENT HWIO Determines message waveform fault (i.e.too many pulse, too few pulse, clock shift) and if the message age is too long.	SENT HWIO Determines message fault (i.e.too many pulse, too few pulse, clock shift) Message Age	= true > 1.69 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active on	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control U0625 P16E5	400 failures out of 500 samples 6.25 ms per 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.
Fuel Pump Driver Control Module Fuel Pump Speed Signal Incorrect	P129F	FTZM ERFS control samples back-Electromotive Force [EMF] for zero voltage-level crossings as a detection method to enable closed loop control brushless commutation. Back EMF is an electrical characteristic of the inactive phase of the 3-phase signal wherein only 2 phases are active at any moment. Brushless pump speed is inferred using rate of zero-crossings detection and number of motor pole-pairs. Speed is reported to the ECM as serial data every 10 millisecs. Diagnostic software [FABR ring] calculates the error between the commanded, arbitrated fuel pump speed [FCBR ring] and the FTZM sensed fuel pump speed. The error is filtered and evaluated against calibratable threshold limits to determine pass/fail status. Any failure that exists on the fuel pump output circuit (3 phases) will be manifested in a Fuel Pump Speed	Sensed Filtered Fuel Pump Speed Error	> Speed Error Low Threshold [Supporting Table] **P129F Threshold Low** OR < Speed Error High Threshold [Supporting Table] **P129F Threshold High**	a) Diagnostic is .. b) CAN Sensor Bus message $0CB_Available c) FABR Fuel Control Enable Fault Active d) Fuel Pmp Speed Command Alive Rolling Count and Checksum Error [CAN Bus B $0CE] [CFMR_b_FTZM_Cmd1_ARC_ChkErr] e) FABR Fuel Pump Ckt FA f) FABR Driver OverTemp FA g) Run_Crank input Voltage h) Sensor Bus Relay On j) CAN Sensor Bus message $0CB Data Fault [CFMR_b_FTZM_Info8_ARC_ChkErr] k) CAN Sensor Bus message $0CB Comm Fault [CFMR_b_FTZM_Info8_UcodeCmFA] l) Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [CFMR_b_FTZM_Cmd1_UcodeCmFA] m) Timer - FABR Rising Edge Diagnostic Delay n) Timer - FABR Falling Edge Diagn Delay	a) Enabled b) == TRUE c) <> TRUE d) <> TRUE e) <> TRUE f) <> TRUE g) > 9.00 volts h) == TRUE j) <> TRUE k) <> TRUE l) <> TRUE m) > 2.30 seconds n) > 0.90 seconds	1 sample / 12.5 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Driver Control Module Enable Circuit Performance	P12A6	The purpose of the Fuel Pump Driver Control Module Enable Circuit Performance diagnostic is to detect if the state of the fuel control enable circuit is valid. This is done by comparing the fuel control enable circuit state [high or low] sensed by the Fuel Tank Zone Module device to the commanded state of the fuel control enable signal from the ECM [in serial data]. When the sensed state does not match the commanded state, the fail counter increments.	Sensed Fuel Control Enable circuit state [Fuel Tank Zone Module device]	<> Fuel Control Enable Active command [serial data]	a) Diagnostic is .. b) Sensor Bus message $0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZM_Info2_ARC_ChkErr] c) CAN Sensor Bus message $OCC_Available d) Sensor Bus Relay On e) Timer [FABR t RunCrankActive]	a) Enabled b) <> TRUE c) == TRUE d) == TRUE e) >= 0.51 seconds	40.00 failures / 80.00 samples 1 sample / 12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Internal Control Module Torque Solver Performance	P134C	The performance of internal control module torque solver is monitored by the iteration number required to complete the computation as well as comparison of the values determined by the solver against constraints. The torque solver performance is monitored only if the torque control is enabled.	Reported iteration number exceeds threshold. Internal control module torque solver requires a certain number of iterations to complete the computation. During normal operation, this number should be smaller than a pre-defined threshold. Two cases are considered as failure: 1) the computation is not completed when the iteration number exceeds the threshold. The reported iteration number is set equal to 1+ maximum number of iterations allowed for the torque solver. 2) the computation is not completed before overrunning the control loop. In this case, the reported iteration number is set equal to the sum of the current iteration number and maximum number of iterations allowed for the torque solver.	> refer to **Maximum number of iterations allowed for torque solver** in supporting tables	Diagnostic enabled and Control module resource monitor enabled	= Enabled = Enabled	5.00 failures out of 8.00 samples 25 ms /sample	Type B, 2 Trips
			Reported solution exceeds lower/upper bounds by more than allowed value.	Solution minus lower bound < - 10.00 or	Diagnostic enabled	= Enabled	5.00 failures out of 8.00 samples 25ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			If not in Case 1 or Case 3, the solution determined by internal control module torque solver should remain higher or equal to pre-determined lower bound and lower or equal to pre-determined upper bound. Due to the nature of floating point computation in ECM (engine control module), the solution is allowed to exceed its lower/upper bounds by a value determined by the threshold. Exceeding lower/upper bounds by more than allowed value is considered as failure.	Solution plus upper bound > 10.00.				
			Reported iteration number is negative. The normal range of iteration number that allows the internal control module torque solver to find a solution is between 0 and maximum number of iterations allowed. The reported iteration number becomes negative in the following two cases which are both considered as failure: 1) the torque solver	Reported iteration number < 0.	Diagnostic enabled	= Enabled	1 failure	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			cannot further proceed before finding a solution AND before the iteration number reaches maximum allowed value. In this case, the reported iteration number is set equal to the negative of the current iteration number. 2) the torque solver returns a solution and is not in CaseI, but the solution is not accurate due to error accumulation of floating point computation. In this case, the reported iteration number is set equal to the negative of the current iteration number minus the maximum allowed iteration number minus 1.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Coil Positive Voltage Circuit Group 1 * * SIDI ONLY * *	P135A	This diagnostic checks for minimum voltage at the fuse which supplies power to the Ignition Coils (applicable only for SIDI applications). A diagnostic failure indicates a blown fuse.	Ignition Module Supply Voltage.	< 2.5 Volts	Diagnostic Enabled? Three possible Ignition Coil Power Sources (only 1 used): Ignition Coil Power Source = Case 1: Battery Delay starting at Key-On Case 2: Ignition Run/ Crank Ignition Run/Crank Voltage Case 3: PT Relay PT Relay Voltage	Yes PT Relay (Case 3) 5 Engine Revs > 5.0 volts >11.0 volts	24 Failures out of 30 Samples 6.25 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Stop Performance	P1387	This is an intrusive diagnostic that runs at the end of every drive cycle for detecting the valve hardware integrity. The valve is commanded to both the lower range and upper range boundary. If the valve hardware is not broken, the valve shall return feedback at the endstop positions. Otherwise, the feedback will return out of range feedback. A diagnostic determination is reported at the completion of the procedures. If both endstops return pass, then a PASS is reported, If any of the endstops returns a fail, then a FAIL is reported.	**Lower Endstop:** Coolant Valve Position Feedback **Upper Endstop:** Coolant Valve Position Feedback	<= -12.09° >= 122.00°	Diagnostic is Enabled 12V System Voltage No pending DTCs No Active DTCs Powertrain Relay Commanded On Engine Block Coolant Temperature is Used on this application Run Crank Active Coolant System Mode	>= 11.00 V (hystersis disable < 10.00 V) VECR_BRV_PstnFdbk_Av VECR_BRV_PstnFdbk_Fol PowertrainRelayStateOn_FA Powertrain Relay Feedback Circuit DTCs P0689, P0690 = True >= -34.00 °C (hystersis disable <= -35.00 °C) = False = Coolant System Initialization	Both endstop tests occur in series and both must complete before a decision is made. **Lower Endstop:** 4 seconds out of a 5 seconds window **Upper Endstop:** 4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Shift Control Module Checksum Switch State Error	P139E	Circuit Monitor mismatch occurs	Switch circuit calculated values	# switch circuit monitor values		Diagnostic will run any time while SIB is awake.	Runs continuously in the background every 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 Oil Pressure High Control Circuit Low	P13B1	Controller specific output driver circuit diagnoses the oil pump high-sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit < 0.5 0 impedance between output and controller ground	Powertrain Relay Voltage Run/Crank Active Cranking State	> 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controllers P06DA may also set (Oil Pump Control Circuit Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Gear Shift Control Module NVM Performance	P13FE	Detects NVM failures related to DTC reporting.	Invalid data detected in DTC-related NVM blocks Calculated CRC	# stored CRC		Diagnostic runs one time each power-up. (This DTC runs one time in the Bootloader Software and one time in the Application Software at each power-up)	One failure	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 Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average actual accumulated exhaust power (too much energy delivered to catalyst) Average desired accumulated exhaust power - Average actual accumulated exhaust power (too little energy delivered to catalyst) (EWMA filtered) Average Power = output of **P1400_EngineSpeedResidual_Table** * output of **P1400_SparkResidual_Table** NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumuated power would use the final commanded spark and actual engine speed. Refer to the Supporting Tables for details	< -32.00 KJ/s (high RPM failure mode) > 15.50 KJ/s (low RPM failure mode)	To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: Catalyst Temperature AND Engine Run Time OR Engine Run Time OR Barometric Pressure	< 400.00 degC > -12.00 degC <= 66.00 degC >= 72.00 KPa >= 700.00 degC >= 0.00 seconds > **P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 72.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 12 seconds of accumulated qualified data.	EWMA Based - Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Other Enable Criteria:			
					OBD Manufacturer Enable Counter	0		
					Vehicle Speed	<1.24MPH		
					Allow diagnostic to calculate residual in an off-idle state. If the value of the OffIdleEnable is equal to 1 then the "DriverOffAccelPedal" will not be checked. However, if the value of OffIdleEnable is 0 then driver must be off the accel pedal	0 (A value of 1 allows diagnostic to run and calculate the residual while off idle. A value of 0 requires calculation of the residual at idle)		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. Therefore when the:			
					Pedal Close Delay Timer	> 3.50 seconds		
					the diagnostic will continue the calculation.			
					A change in gear will initiate a delay in the calculation of the average qualified residual value to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the:			
					Gear Shift Delay Timer	> 2.00 seconds		
					the diagnostic will continue the calculation			
					For Manual Transmission vehicles:			
					Clutch Pedal Position	> 90.00 %		
					Clutch Pedal Position	<16.00%		
					The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period.			
					The time weighting factor must be :	>0 These are scalar values that are a function of engine run time. Refer to		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime and the cal axis, **P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis** in the "Supporting Tables" for details.		
					General Enable:			
					DTC's Not Set:			
						AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFP CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA EngineMisfireDetected_FA ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA 5VoltReferenceMAP_OOR_Flt TransmissionEngagedState_FA EngineTorqueEstInaccurate		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor B Reference Feedback Range/ Performance [For use on vehicles with FTZM and Secondary Fuel Tank]	P143E	This DTC will detect a fault in Secondary fuel tank level sensor 5V reference by comparing DEC ECU commanded signal period and pulse width values against measured period and pulse width reported by the smart device	Reference Voltage 1 Period Error Maximum [Measured Ref V Period - Commanded Ref V Period]	> 25.00 millisec	a] CAN serial data available [$2D7] b] Calibration - Reference Voltage Command Source c] Timer - Reference Voltage Pulse Width Available Synchronization d] Timer - Reference Voltage Period Available Delay e] Diagnostic System Disabled f] FTZM Serial Data Info4 Rolling Counter Check Error g] Reference Voltage Performance 1 Diagnostic Enabled	a] —— True b] == ECM c] > 1.25 sec d] > 0.75 sec e] <> True f] <> True g] == TRUE	250 ms / sample 16 Failures/ 20 Samples	Type B, 2 Trips
			Reference Voltage 1 Pulse Width Error Maximum [Measured Ref V PW - Commanded Ref V PW]	> 1.50 millisec	a] CAN serial data available [$2D7] b] Calibration - Reference Voltage Command Source c] Timer - Reference Voltage Pulse Width Available Synchronization d] Timer - Reference Voltage Period Available Delay e] Diagnostic System Disabled	a] —— True b] == ECM c] > 1.25 sec d] > 0.75 sec e] <> True	250 ms / sample 16 Failures/ 20 Samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					f] FTZM Serial Data Info4 Rolling Counter Check Error g] Reference Voltage Performance 1 Diagnostic Enabled	f] <> True g] == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EVAP Purge Pump On Speed Performance	P1467	Purge pump speed does not match requested pump speed when pump is commanded on	Purge pump speed	> refer to **Purge pump speed on value too high** in Supporting Tables. Calibration threshold for pump speed too high as func of pump supply voltage	Diagnostic is Enabled		100 failures out of 125 samples 100 msec / sample	Type B, 2 Trips
					Propulsion system on			
					Purge pump commanded on			
					LIN data available for	> 2 counts		
			Purge pump speed	< refer to **Purge pump speed on value too low** in Supporting Tables. Calibration threshold for pump speed too low as func of pump supply voltage	Outside Air Temp	>-20 °C		
					Powertrain relay voltage	>11.0 volts		
					Barometric pressure	>70 kPa		
					Time delay	> 14 seconds for purge pump speed to spool up (pump off to on)		
					Purge Pump Over Temperature Status	= False		
					No active DTCs	P1469 - Purge Pump Speed OOR Low P146A- Purge Pump Speed OOR High P148E - Purge Pump Voltage OOR Low P148F - Purge Pump Voltage OOR High P1490 - Purge Pump Voltage Performance P14A4-EVAP Purge Pump Temperature Too High		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No pending DTC's	Purge Pump LIN Communication Fault Active AmbientAirDefault OAT_AmbientSensorFA P1469 - Purge Pump Speed OOR Low P146A- Purge Pump Speed OOR High Purge Pump LIN Communication Fault Pending		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EVAP Purge Pump Off Speed Performance	P1468	Purge pump speed does not match requested pump speed when pump is commanded off	Absolute value of purge pump speed	> 240 RPM	Diagnostic is Enabled		50 failures out of 63 samples 100 msec / sample	Type B, 2 Trips
					Propulsion system on			
					Purge pump commanded off			
					LIN data available for	> 2 counts		
					Powertrain relay voltage	>11.0 volts		
					Time delay	>21 seconds for purge pump speed to spool up (pump on to off)		
					No active DTCs	P1469 - Purge Pump Speed OOR Low Fault Active P146A- Purge Pump Speed OOR High Fault Active P148E - Purge Pump Voltage OOR Low P148F - Purge Pump Voltage OOR High P1490 - Purge Pump Voltage Performance Purge Pump LIN Communication Fault Active		
					No pending DTCs	P1469 - Purge Pump Speed OOR Low P146A- Purge Pump Speed OOR High		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EVAP Purge Pump Speed Too Low	P1469	Purge pump speed signal is out of range low	Purge pump speed	< -100RPM	Diagnostic is Enabled LIN data available for Powertrain relay voltage No active DTCs No pending DTCs	 > 2 counts >11.0 volts P148E - Purge Pump Voltage OOR Low P148F - Purge Pump Voltage OOR High P1490 - Purge Pump Voltage Performance Purge Pump LIN Communication Fault Active Purge Pump LIN Communication Fault Pending	50 failures out of 63 samples 100 msec / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EVAP Purge Pump Speed Too High	P146A	Purge pump speed signal is out of range high	Purge pump speed	> 55,000 RPM	Diagnostic is Enabled LIN data available for Powertrain relay voltage No active DTCs No pending DTCs	 > 2 counts >11.0 volts P148E - Purge Pump Voltage OOR Low P148F - Purge Pump Voltage OOR High P1490 - Purge Pump Voltage Performance Purge Pump LIN Communication Fault Active Purge Pump LIN Communication Fault Pending	50 failures out of 63 samples 100 msec / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EVAP Purge Pump System Performance (Continuous Flow Version)	P146B	Purge pump system flow performance, based on pressure sensor feedback, is too low or too high. A purge system, that employs a purge pump, will monitor the purge flow delivery through the evaporative emission system. The estimated purge flow is calculated as a function of pressure across the purge solenoid valve. The failure threshold purge flow is calculated as a function of purge valve duty cycle and barometric pressure. The ratio of the estimated purge flow and failure threshold purge flow is calculated and compared to a threshold. A fault pending is set when the calculated ratio is greater than or less than calibration thresholds. These fault pending states are processed by X out of Y logic.	Purge pump flow ratio low Purge pump flow ratio low = estimated purge flow as a function of pressure across purge solenoid valve / failure threshold for purge low flow as a function of purge valve duty cycle and barometric pressure Purge pump flow ratio high Purge pump flow ratio high = estimated purge flow as a function of pressure across purge solenoid valve / failure threshold for purge high flow as a function of purge valve duty cycle and barometric pressure	< refer to **Purge pump performance low flow ratio threshold** in Supporting Tables. Calibration threshold for performance too low as func of purge valve duty cycle and barometric pressue > refer to **Purge pump performance high flow ratio threshold** in Supporting Tables. Calibration threshold for performance too high as func of purge valve duty cycle and barometric pressure	Diagnostic is Enabled		80 failures out of 100 samples 100 msec / sample	Type B, 2 Trips
					Propulsion system on			
					Conditions for Estimated Ambient Temperature Using OAT Sensor to be Valid (read description for details)	= TRUE		
					Outside Air Temperature	> 0 °C		
					Outside Air Temperature	< 50 °C		
					Barometric Pressure	> 70 kPa		
					Pump speed on timer	> 14 seconds		
					No device control			
					Averaging of pump pressure sensor reading is valid	= TRUE		
					Purge is enabled			
					EVAP diagnostics are not running (This means purge valve leak (P0496), large leak (P0455), and canister vent restriction (P0446) diagnostics have completed or did not need to run) and delay timer	= TRUE > 5.0 Seconds		
					LIN data available for	> 2 counts		
					LIN IAT data available			
					Powertrain relay voltage	>11.0 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					******************************	******************************		
					When entering or re-entering the enable criteria in this section a delay timer needs to expire	> 1.0 Seconds		
					Engine RPM to enable	400 RPM <X< 6,800 RPM		
					Engine RPM to remain enabled	350 RPM <X< 6,850 RPM		
					Engine airlow to enable	0 g/s <X< 30 g/s		
					Engine airlow to remain enabled	-5 g/s <X< 35 g/s		
					Purge solenoid DC to enable	5<X<101 %		
					Purge solenoid DC to remain enabled	2<X<104%		
					Purge gas flow ratio to enable	**Purge System Low Purge Flow Enable** <X< **Purge System High Purge Flow Enable** in Supporting Tables.		
					Purge gas flow ratio to remain enabled	**Purge System Low Purge Flow Remain Enabled** <X< **Purge System High Purge Flow Remain Enabled** in Supporting Tables.		
					Purge flow to enable	0.0 <X< 1.5 g/s		
					Purge flow to remain enabled	-0.1 <X< 1.6 g/s		
					Induction vacuum to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable	<0.3 kPa		
					Induction vacuum to remain enabled	<0.5 kPa		
					Vehicle Speed to enable	>3.1 mph		
					Vehicle Speed to remain enabled	>1.9 mph		
					IAT to enable	0.0 <X< 100.00 deg C		
					IAT to remain enabled	-5.0 <X< 105.00 deg C		
					Purge DC change per 100 ms loop to enable	X< 5.0 %		
					Purge DC change per 100 ms loop to remain enable	X< 6.0 %		
					******************************	******************************		
					No active DTCs	P1467- EVAP Purge Pump On Speed Performance P1469 - Purge Pump Speed OOR Low P146A- Purge Pump Speed OOR High P146D - Purge Pump Pressure Sensor OOR Low P146E - Purge Pump Pressure Sensor OOR High P146F - Purge Pump Pressure Sensor Performance P148E - Purge Pump		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No pending DTC's	Voltage OOR Low P148F - Purge Pump Voltage OOR High P1490 - Purge Pump Voltage Performance P14A4-EVAP Purge Pump Temperature Too High Purge Pump LIN Communication Fault Active AmbientAirDefault ConvVenting_FA ConvPurgeCkt_FA VehicleSpeedSensor_FA OAT_EstAmbTemp_FA IAT_SensorFA P14A4-EVAP Purge Pump Temperature Too High Purge Pump LIN Communication Fault Pending IAT_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EVAP Purge Pump System Misassembled	P146C	Purge pump pressure is too low for a given pump speed with the purge valve commanded closed. Detects a disconnected hose between the purge pump and purge valve.	Average Purge Pump Pressure Reading - Initial Purge Pump Pressure Reading Readings are averaged for 5 seconds.	< **Purge Pump Misassembled Failure Threshold** * (times) **Purge Pump Diagnostic IAT Multiplier Factor** both in Supporting Tables Calibration threshold (kPa) as a func of (Average Purge Pump Speed and barometric pressure) * IAT multiplier factor (unitless) as a func of IAT	Diagnostic is Enabled		Once per trip	Type B, 2 Trips
					Purge duty cycle is commanded to zero			
					Purge pump commanded on			
					Engine running			
					LIN data available for	> 2 counts		
					LIN IAT data available			
					Powertrain relay voltage	>11.0 volts		
					Barometric pressure	>70 kPa		
					Purge pump initial speed	<240 RPM		
					Outside Air Temperature	-20°C<X<50°C		
					Initial average purge pump pressure calculated and in range	-3 kPa <X<13kPA		
					Outside air temperature	>0°C (only if pressure sensor is not in the range of -3 kPa <X<13kPA)		
					No device control			
					Pump spool up time delay	> 7 seconds		
					Allow test time	< 36 seconds		
					Purge pump over temperature status	= FALSE		
					Initial pump speed capture period	> 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Purge pump speed	>35,000 RPM		
					No active DTCs	P1467- EVAP Purge Pump On Speed Performance P1469 - Purge Pump Speed OOR Low P146A- Purge Pump Speed OOR High P146D - Purge Pump Pressure Sensor OOR Low P146E - Purge Pump Pressure Sensor OOR High P146F - Purge Pump Pressure Sensor Performance P148E - Purge Pump Voltage OOR Low P148F - Purge Pump Voltage OOR High P1490 - Purge Pump Voltage Performance P14A4-EVAP Purge Pump Temperature Too High Purge Pump LIN Communication Fault Active AmbientAirDefault OAT_AmbientSensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					No pending DTC's	ConvPurgeCkt_FA IAT_SensorFA ECT_Sensor_FA P1469 - Purge Pump Speed OOR Low P146A- Purge Pump Speed OOR High P146D - Purge Pump Pressure Sensor OOR Low P146E - Purge Pump Pressure Sensor OOR High Purge Pump LIN Communication Fault Pending IAT_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EVAP Purge Pump Pressure Sensor Circuit Low Voltage	P146D	This DTC will detect a Purge Pump Pressure sensor signal that is too low out of range. The Purge Pump Pressure sensor circuit out of range diagnostic compares the raw sensor % of 5 V ref to a lower threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor % of 5 V ref is below the lower threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P146D DTC. A pass is reported for P146D DTC if the low sample counter reaches its threshold.	Purge pump pressure sensor signal The normal operating range of the purge pump pressure sensor is 0.5 volts (~ -6000 Pa) to 4.5 volts (~ 26000 Pa).	<3.0% of 5Vref(0.1V or -8,800 Pa)	Diagnostic is 1.00		1,280 failures out of 1,600 samples 6.25 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.
EVAP Purge Pump Pressure Sensor Circuit High Voltage	P146E	This DTC will detect a Purge Pump Pressure sensor signal that is too high out of range. The Purge Pump Pressure sensor circuit out of range diagnostic compares the raw sensor % of 5 V ref to a upper threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor % of 5 V ref is above the upper threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for P146E DTC. A pass is reported for P146E DTC if the high sample counter reaches its threshold.	Purge pump pressure sensor signal The normal operating range of the purge pump pressure sensor is 0.5 volts (~ -6000 Pa) to 4.5 volts (~ 26000 Pa).	>97.0% of 5 Vref (4.9 V or 28,800 Pa	Diagnostic is 1.00		1,280 failures out of 1,600 samples 6.25 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.
EVAP Purge Pump Pressure Sensor Performance	P146F	Purge pump pressure sensor offset pressure is out of range when sensor re-zero occurs. The DTC will be set if the purge pump pressure sensor offset is out of range when it tries to re-zero at the beginning of a cold start drive cycle. The re-zero test determines if the purge pump pressure sensor signal falls within a calibratable window about atmospheric pressure. The results of the re-zero test are used to determine if there is a re-zero problem. 1) An individual re-zero test generates a re-zero ratio. The ratio goes from 0.0 to 1.0. 2) A 0.0 means that the re-zero pressure signal achieved exactly the previous learned offset. 3) A ratio of 1.0 means that the re-zero pressure did not get within the window. 4) Re-zero pressure within the window generates values between 0.0 and 1.0.	The purge pump pressure sesnor signal is compared to a window about barometric pressure (sensor voltage offset (-1.25 volts)) Upper pressure threshold (pressure addition above the nominal barometric pressure) The learned delta above the previous learned offset needs to be Lower pressure threshold (pressure subtraction below the nominal barometric pressure) The learned delta below the previous learned offset needs to be The difference between purge pump pressure sensor signal and the previous learned offset is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is the DTC light is	0.96 kPa rezero max < 1.68 kPa delta max -0.96 kPa rezero min >-1.68 kPa delta min > 0.73 (EWMA Fail Threshold),	Diagnostic is Enabled Soak timer Power up coolant temperature Barometric pressure Engine not cranking Power up IAT Power up IAT LIN IAT data available Power Up Coolant temp - Power Up IAT temp Average purge pump pressure calculated No Active DTC's No Pending DTC's	>3,600 seconds <35 °C >70 kPa >4 °C <35 °C <8 °C P146D - Purge Pump Pressure Sensor OCR Low Fault Active P146E - Purge Pump Pressure Sensor OCR High Fault Active IAT_SensorFA ECT_Sensor_FA EngineModeNotRunTimer_FA AmbientAirDefault P146D - Purge Pump Pressure Sensor OCR Low Fault Active P146E - Purge Pump Pressure Sensor OCR High Fault Active	100 ms	Type A, 1 Trips EWMA Average run length: 6 Run length is 2 trips after code clear

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		The resulting re-zero ratio is filtered using an exponentially weighted moving average (EWMA). When the EWMA exceeds a fail threshold, the purge pump pressure sensor signal re-zero test reports a failure. Once the purge pump pressure sensor signal re-zero test fails, the EWMA fall below a lower re-pass threshold before it can pass the purge pump pressure sensor signal re-zero test again.	illuminated. The EWMA calculation uses a 0.20 weighting coefficient. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	<0.40 (EWMA Re-Pass Threshold				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
EVAP Purge Pump Voltage Sensor Circuit Low	P148E	This DTC will detect a purge pump voltage sensor signal that is out of range low (short to ground or open circuit). The purge pump voltage sensor signal out of range diagnostic compares the voltage sensor signal reading to a lower voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the voltage sensor signal reading is below the lower voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P148E DTC. A pass is reported for P148E DTC if the low sample counter reaches its threshold.	Purge pump voltage sensor reading	<3.5 volts	Diagnostic is Enabled LIN data available for Powertrain relay voltage No active DTCs Np pending DTCs	 > 2 counts >11.0 volts Purge Pump LIN Communication Fault Active Purge Pump LIN Communication Fault Pending	50 failures out of 63 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.
EVAP Purge Pump Voltage Sensor Circuit High	P148F	This DTC will detect a purge pump voltage sensor signal that is out of range high (short to power). The purge pump voltage sensor signal out of range diagnostic compares the voltage sensor signal reading to a upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the voltage sensor signal reading is above the upper voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P148F DTC. A pass is reported for P148F DTC if the low sample counter reaches its threshold.	Purge pump voltage sensor reading	>28.0 volts	Diagnostic is Enabled LIN data available for Powertrain relay voltage No active DTCs Np pending DTCs	 > 2 counts >11.0 volts Purge Pump LIN Communication Fault Active Purge Pump LIN Communication Fault Pending	50 failures out of 63 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.
EVAP Purge Pump Voltage Sensor Performance	P1490	This diagnostic fails when the difference between purge pump voltage sensor reading and powertrain relay voltage reading is too large.	Absolute value of (Purge pump voltage sensor - powertrain relay voltage)	>2.0 volts	Diagnostic is Enabled Propulsion system on Powertrain relay voltage Engine not cranking Voltage stabilization delay time after engine crank (> 2 seconds) LIN data available for No Active DTC's No Pending DTC's	 >11.0 volts > 2.0 seconds >2 counts P148E - Purge Pump Voltage OOR Low P148F - Purge Pump Voltage OOR High Purge Pump LIN Communication Fault Active P148E - Purge Pump Voltage OOR Low P148F - Purge Pump Voltage OOR High Purge Pump LIN Communication Fault Pending	80 failures out of 100 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.
Engine Coolant Temperature Sensor 2 Not Plausible	P149A	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6 The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the		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 - BiasChkHtrCrlnClntSnsr - BiasChkHtrCrOutClnSnsr - BiasChkRadOutClntSnsr - BiasChkBypInClntSnsr - BiasChkEngMetalSnsr - BiasChklntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSnsr - BiasChk_EGR_DwnStmS	 OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_TS2_CktFA EECR_CylHeadCoolant_CktFA EECR_BlockCoolant_CktFA EECR_Enginelnlet_CktFA EECR_EngineOutlet_CktFA EECR_HeaterCorelnlet_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.
			physical (Temperature) sensor number. **Bypass Inlet:** CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Engine Block:** CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCylHdClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngOilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRadOutClntSnsr	20.00 °C 10.00 °C 30.00 °C 10.00 °C	nsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors ================== The following thresholds are based on the sensor under diagnosis **Bypass Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Coolant:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Radiator Outlet:** Propulsion Off Soak Time Ambient Air Temperature	EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible > 28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-9.0 °C >28,800 seconds >-20.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Head Coolant:** CeEECR_e_PhysSnsr6 Comparison sensor 1: CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngOilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkBypInClntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater:	25.00 °C 17.00 °C 20.00 °C 10.00 °C	================= Comparison sensor 1 & 2 are not ================= Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application: 2x2 signature	= CeEECR_e_BiasChkNoSelection Same set as listed above and EngineModeNotRunTimerError EngineModeNotRunTimer_FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrBlockClntSnsr CeAEHR_e_BlkHtrRadOutClntSnsr >10.00 °C > 0 seconds >28,800 seconds >-9.00 °C Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAss gnmnt Comparison sensor 1: CeEECR_e_BiasChkEng OilSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEng InClntSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asLow Threshold A: Threshold B: A failure will be reported if any of the following	15.00 °C 10.00 °C 25.00 °C 17.00 °C 30.00 °C 17.00 °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 A block heater is detected	Enabled Disabled Disabled CeAEHR_e_BlkHtrCylHd ClntSnsr CeAEHR_e_BlkHtrEngIn ClntSnsr CeAEHR_e_BlkHtrRadO utClntSnsr CeAEHR_e_BlkHtrOutsid eAirSnsr 10.0 °C 10.0 °C >10.0 °C CeAEHR_e_BlkHtrBlock ClntSnsr >9.00 L/min 0.0 - 60.0 seconds < 120.0 seconds >300.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			conditions are met. Evaluated in order:		if a drop is	>5.0°C		
				>A°C	**IAT Drop Criteria:**			
			1) This sensor is above both comparison sensors		The sensor will be used as IAT for this method	CeAEHR_e_BlkHtrIntakeAirSnsr		
				>A°C				
			2) This sensor is below both comparison sensors		A block heater will be detected if:			
				>B°C	IAT has a drop of	>5.0°C		
			3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew		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			
				>B°C				
			4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew			0.5 times the seconds with vehicle speed below the threshold above		
					This detection method will abort if the engine is off OR Engine runtime	 > 180.0 seconds > 1,800 seconds		
					Temperature Derivative Criteria:			
					Derivative will be monitored using	CeAEHR_e_BlkHtrBlockClntSnsr		
					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	 >-1.00 L/min 5.0 -15.0 seconds < 75.0 seconds >300.0 seconds		

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 =================	<-0.10°C/sec > 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 5 Not Plausible	P149D	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5 Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6 The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the		Diagnostic is Enabled No Active DTCs Propulsion system Inactive timer error Sensor under diagnosis is not faulted Used comparison sensors are not currently faulted: - BiasChkCylHdCIntSnsr - BiasChkBlockClntSnsr - BiasChkEngInCIntSnsr - BiasChkEngOutCIntSnsr - BiasChkHtrCrlnCIntSnsr - BiasChkHtrCrOutClnSnsr - BiasChkRadOutCIntSnsr - BiasChkBypInCIntSnsr - BiasChkEngMetalSnsr - BiasChkIntakeAirSnsr - BiasChkHumTmpSnsr - BiasChkManfldAirSnsr - BiasChkOutsideAirSnsr - BiasChkEngOilSnsr - BiasChk_EGR_UpStrmSnsr - BiasChk_EGR_DwnStmS	 OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_TS5_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	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.
			physical (Temperature) sensor number. **Bypass Inlet:** CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Engine Block:** CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCylHdClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngOilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRadOutClntSnsr	20.00 °C 10.00 °C 30.00 °C 10.00 °C	nsr - BiasChk_EGR_LowPrsSnsr - BiasChkFuelSnsr Comparison sensors ================== The following thresholds are based on the sensor under diagnosis **Bypass Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Coolant:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Radiator Outlet:** Propulsion Off Soak Time Ambient Air Temperature =================	EGRTempSensorDNSS_FA LPE_TempSnsrFA HRTR_b_FuelSensor_FA_Bndl = Availible > 28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-9.0 °C >28,800 seconds >-20.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Head Coolant:** CeEECR_e_PhysSnsr6 Comparison sensor 1: CeEECR_e_BiasChkBlockClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEngOilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Heater Inlet:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkBypInClntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater:	25.00 °C 17.00 °C 20.00 °C 10.00 °C	Comparison sensor 1 & 2 are not ================= Aux Heat Detection Aux heat detection can only be enabled the following are met: No Active DTCs At power-up a warm sensor and cool sensor are compared Warm sensor Cool sensor If the warm sensor is compared to the cool sensor Propulsion Off Soak Time Engine Off Soak Time Ambient Air Temperature There are 4 different types of aux heater detection for this application: 2x2 signature Absolute Drop	= CeEECR_e_BiasChkNoSelection Same set as listed above and EngineModeNotRunTimerError EngineModeNotRunTimer_FA VehicleSpeedSensor_FA CeAEHR_e_BlkHtrBlockClntSnsr CeAEHR_e_BlkHtrRadOutClntSnsr >10.00 °C > 0 seconds >28,800 seconds >-9.00 °C Enabled Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterBiasHigh Threshold A: Threshold B: **Heater Outlet:** CeEECR_e_NoPhysAssgnmnt Comparison sensor 1: CeEECR_e_BiasChkEngOilSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasBoth Threshold A: Threshold B: **Radiator Outlet:** CeEECR_e_PhysSnsr3 Comparison sensor 1: CeEECR_e_BiasChkEngInClntSnsr Comparison sensor 2: CeEECR_e_BiasChkManfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterNoEffect Block Heater: CeEECR_e_AuxHeaterBiasLow Threshold A: Threshold B: A failure will be reported if any of the following	15.00 °C 10.00 °C 25.00 °C 17.00 °C 30.00 °C 17.00 °C	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 A block heater is detected	Disabled Disabled CeAEHR_e_BlkHtrCylHdClntSnsr CeAEHR_e_BlkHtrEngInClntSnsr CeAEHR_e_BlkHtrRadOutClntSnsr CeAEHR_e_BlkHtrOutsideAirSnsr 10.0 °C 10.0 °C >10.0 °C CeAEHR_e_BlkHtrBlockClntSnsr >9.00 L/min 0.0 -60.0 seconds < 120.0 seconds >300.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			conditions are met. Evaluated in order:		if a drop is	>5.0°C		
			1) This sensor is above both comparison sensors	>A°C	**IAT Drop Criteria:** The sensor will be used as IAT for this method	CeAEHR_e_BlkHtrIntakeAirSnsr		
			2) This sensor is below both comparison sensors	>A°C	A block heater will be detected if:			
			3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew	>B°C	IAT has a drop of during a drive defined by: Drive time Vehicle speed	>5.0°C >400.0 seconds >24.0kph		
			4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	>B°C	Addtional drive time is provided when vehicle speed drops below above threshold as follows	0.5 times the seconds with vehicle speed below the threshold above		
					This detection method will abort if the engine is off OR Engine runtime	> 180.0 seconds > 1,800 seconds		
					Temperature Derivative Criteria: Derivative will be monitored using	CeAEHR_e_BlkHtrBlockClntSnsr		
					Derivative will be monitored once coolant flow is	>-1.00 L/min		
					AND Flow time is between	5.0 -15.0 seconds		
					AND either Engine runtime is	< 75.0 seconds		
					OR Insufficent coolant flow is present for	>300.0 seconds		

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 =================	<-0.10°C/sec > 4 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 6 Not Plausible	P149E	This DTC detects either a biased high or low temperature sensor. This is done by comparing this sensor with two other temperature sensors.	This sensor is compared to two other sensors for this diagnostic to function. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr6 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6 The comparison sensors, temperature thresholds, and aux heater effects can be looked up by finding the location associated with the		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_EGR_UpStrmSnsr - BiasChk_EGR_DwnStmS	 OAT_PtEstFiltFA PSAR_PropSysInactveCrs_FA = FALSE EECR_TS6_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	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.
			physical (Temperature) sensor number. **Bypass Inlet:** CeEECR_e_PhysSnsr2 Comparison sensor 1: CeEECR_e_BiasChkEng OilSnsr Comparison sensor 2: CeEECR_e_BiasChkMa nfldAirSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asHigh Threshold A: Threshold B: **Engine Block:** CeEECR_e_PhysSnsr7 Comparison sensor 1: CeEECR_e_BiasChkCyl HdClntSnsr Comparison sensor 2: CeEECR_e_BiasChkEng OilSnsr Fuel Operated heater: CeEECR_e_AuxHeaterN oEffect Block Heater: CeEECR_e_AuxHeaterBi asBoth Threshold A: Threshold B: **Engine Inlet:** CeEECR_e_PhysSnsr1 Comparison sensor 1: CeEECR_e_BiasChkRad OutClntSnsr	20.00 °C 10.00 °C 30.00 °C 10.00 °C	nsr - BiasChk_EGR_LowPrsSn sr - BiasChkFuelSnsr Comparison sensors ================== The following thresholds are based on the sensor under diagnosis **Bypass Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Engine Block:** Propulsion Off Soak Time Ambient Air Temperature **Engine Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Head Coolant:** Propulsion Off Soak Time Ambient Air Temperature **Heater Inlet:** Propulsion Off Soak Time Ambient Air Temperature **Heater Outlet:** Propulsion Off Soak Time Ambient Air Temperature **Radiator Outlet:** Propulsion Off Soak Time Ambient Air Temperature	EGRTempSensorDNSS_F A LPE_TempSnsrFA HRTR_b_FuelSensor_FA _Bndl = Availible > 28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-20.0 °C >28,800 seconds >-9.0 °C >28,800 seconds >-20.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Comparison sensor 2:		=================			
			CeEECR_e_BiasChkMa					
			nfldAirSnsr		Comparison sensor 1 & 2			
			Fuel Operated heater:		are not	=		
			CeEECR_e_AuxHeaterN			CeEECR_e_BiasChkNoS		
			oEffect			election		
			Block Heater:		=================			
			CeEECR_e_AuxHeaterBi		Aux Heat Detection			
			asHigh					
			Threshold A:	25.00 °C	Aux heat detection can			
			Threshold B:	17.00 °C	only be enabled the			
					following are met:			
			Head Coolant:					
			CeEECR_e_PhysSnsr6		No Active DTCs	Same set as listed above		
			Comparison sensor 1:			and		
			CeEECR_e_BiasChkBlo			EngineModeNotRunTimer		
			ckClntSnsr			Error		
			Comparison sensor 2:			EngineModeNotRunTimer		
			CeEECR_e_BiasChkEng			_FA		
			OilSnsr			VehicleSpeedSensor_FA		
			Fuel Operated heater:		At power-up a warm			
			CeEECR_e_AuxHeaterN		sensor and cool sensor			
			oEffect		are compared			
			Block Heater:		Warm sensor	CeAEHR_e_BlkHtrBlock		
			CeEECR_e_AuxHeaterBi			ClntSnsr		
			asBoth		Cool sensor	CeAEHR_e_BlkHtrRadO		
			Threshold A:	20.00 °C		utClntSnsr		
			Threshold B:	10.00 °C				
					If the warm sensor is	>10.00 °C		
			Heater Inlet:		compared to the cool			
			CeEECR_e_NoPhysAss		sensor			
			gnmnt					
			Comparison sensor 1:		Propulsion Off Soak Time	> 0 seconds		
			CeEECR_e_BiasChkByp		Engine Off Soak Time	>28,800 seconds		
			InClntSnsr		Ambient Air Temperature	>-9.00 °C		
			Comparison sensor 2:					
			CeEECR_e_BiasChkMa		There are 4 different			
			nfldAirSnsr		types of aux heater			
			Fuel Operated heater:		detection for this			
			CeEECR_e_AuxHeaterN		application:			
			oEffect					
			Block Heater:		2x2 signature	Enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			CeEECR_e_AuxHeaterBi		Absolute Drop	Enabled		
			asHigh		IAT Drop	Disabled		
			Threshold A:	15.00 °C	Temperature Derivative	Disabled		
			Threshold B:	10.00 °C				
					2x2 Signature Criteria:			
			Heater Outlet:		The warm sensors			
			CeEECR_e_NoPhysAss		Sensor 1:	CeAEHR_e_BlkHtrCylHd		
			gnmnt			ClntSnsr		
			Comparison sensor 1:		Sensor 2:	CeAEHR_e_BlkHtrEngIn		
			CeEECR_e_BiasChkEng			ClntSnsr		
			OilSnsr					
			Comparison sensor 2:		The cool sensors			
			CeEECR_e_BiasChkMa		Sensor 1:	CeAEHR_e_BlkHtrRadO		
			nfldAirSnsr			utClntSnsr		
			Fuel Operated heater:		Sensor 2:	CeAEHR_e_BlkHtrOutsid		
			CeEECR_e_AuxHeaterN			eAirSnsr		
			oEffect					
			Block Heater:		A block heater will be			
			CeEECR_e_AuxHeaterBi		detected if the warm			
			asBoth	25.00 °C	sensors are within	10.0 °C		
			Threshold A:	17.00 °C	AND			
			Threshold B:		The cool sensors are			
					within	10.0 °C		
			Radiator Outlet:		AND			
			CeEECR_e_PhysSnsr3		The delta between the			
			Comparison sensor 1:		two groups (warm/cold)	>10.0 °C		
			CeEECR_e_BiasChkEng					
			InClntSnsr		**Absolute Drop Criteria:**			
			Comparison sensor 2:		The	CeAEHR_e_BlkHtrBlock		
			CeEECR_e_BiasChkMa		is monitored for a drop.	ClntSnsr		
			nfldAirSnsr					
			Fuel Operated heater:		The drop will be			
			CeEECR_e_AuxHeaterN		monitored for once			
			oEffect		coolant flow is	>9.00 L/min		
			Block Heater:		AND			
			CeEECR_e_AuxHeaterBi		Flow time is between	0.0 -60.0 seconds		
			asLow	30.00 °C	ANDeither			
			Threshold A:	17.00 °C	Engine runtime is	< 120.0 seconds		
			Threshold B:		OR			
					Insufficent coolant flow is			
			A failure will be reported if		present for	>300.0 seconds		
			any of the following					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			conditions are met.		A block heater is detected			
			Evaluated in order:		if a drop is	>5.0°C		
				>A°C				
			1) This sensor is		**IAT Drop Criteria:**			
			above both comparison		The			
			sensors		sensor will be used as IAT	CeAEHR_e_BlkHtrIntake		
				>A°C	for this method	AirSnsr		
			2) This sensor is					
			below both comparison		A block heater will be			
			sensors		detected if:			
				>B°C				
			3) This sensor is		IAT has a drop of	>5.0°C		
			above both comparison		during a drive defined by:			
			sensors and an aux heat		Drive time	>400.0 seconds		
			source has not been		Vehicle speed	>24.0kph		
			detected to cause this					
			skew		Addtional drive time is			
				>B°C	provided when vehicle			
			4) This sensor is		speed drops below above			
			below both comparison		threshold as follows	0.5 times the seconds		
			sensors and an aux heat			with vehicle speed below		
			source has not been			the threshold above		
			detected to cause this		This detection method will			
			skew		abort if the engine is off	> 180.0 seconds		
					OR			
					Engine runtime	> 1,800 seconds		
					Temperature Derivative Criteria:			
					Derivative will be	CeAEHR_e_BlkHtrBlock		
					monitored using	ClntSnsr		
					Derivative will be			
					monitored once coolant			
					flow is	>-1.00 L/min		
					AND			
					Flow time is between	5.0 -15.0 seconds		
					AND either			
					Engine runtime is	< 75.0 seconds		
					OR			
					Insufficent coolant flow is			
					present for	>300.0 seconds		

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 =================	<-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.
EVAP Purge Pump Temperature Too High	P14A4	Purge pump indicates it is too hot to operate and is in a protection mode (shuts down and/ or will not turn on). Diagnostic rationalizes the purge pump too hot status against environmental and vehicle operating conditions.	Purge pump over temperature status AND Intake Air Temperature AND OBD Max Coolant Achieved (read description for details)	= True <45.0 °C = FALSE	Diagnostic is Enabled Propulsion system on LIN data available for LIN IAT data available Engine running time Powertrain relay voltage No Active DTC's No Pending DTC's	 > 2 counts > 30 seconds >11.0 volts IAT_SensorFA ECT_Sensor_FA Purge Pump LIN Communication Fault Active Purge Pump LIN Communication Fault Pending	80 failures out of 100 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.
Fuel Pump Driver Control Module Configuration Command Signal 1 Message Counter Incorrect	P14CD	The FTZM monitors its specific command data serial message frames [message FTZM CommandI $0CE] received from the ECM over its private CAN channel and evaluates whether these data are updating regularly. The FTZM diagnostic runs every 10msec. Each FTZM diagnostic evaluation is sent back to the ECM over the private bus. When the ECM diagnostic detects that the transmitted message counter and the received message counter do not match, it will increment a fail counter. The diagnostic status is monitored using X/Y counting and the Diagnostic Trouble Code is set when the failure count has matured to its threshold value. The X/Y counting is a rolling array type where X of the most recent Y samples represent a failing status, and it is updated continuously with each execution loop and resets only on an end-of-trip event.	FTZM bus CAN Message CommandI $0CE Alive Rolling Counter transmitted from ECM OR FTZM bus CAN Message CommandI $0CE Protection Value checksum transmitted from ECM	<> ARC sequence at FTZM OR <> Protection Value checksum at FTZM	a) Diagnostic is .. b) Diagnostic System Disabled c) System Voltage [Batt In Range] d) FTZM bus [Sensor Bus] Wakeup signal e) Diagnostic delay time f) Message Received status g) Data Received status h) No message fault conditions present	a) .. Enabled b) == False c) > 8.00 volts d) == TRUE e) > 3,000.00 miilisec f) == TRUE g) == TRUE h) == TRUE	15.00 Fail counts out of 16.00 Sample counts continuously updated rolling array 12.5 msec loop execution	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Position Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position.	The absolute difference between desired and indicated throttle position is >	2.00%	Run/Crank voltage	> 6.41 Volts	0.49 ms	Type B, 2 Trips
					TPS minimum learn is not active AND Throttle is being Controlled			
					Throttle is considered in a steady state condition when the desired throttle position over a 12.5 ms period is	< 0.25 percent		
					For a settling time period	> 4.00 seconds		
					Ignition voltage failure is false	P1682		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Switch State Undertermin ed	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions "Emissions Neutral Default Action : When the BCM tells the ECM that the cruise switch “Data Invalid” (latched on/off switch architectures) or “Indeterminate” (mome ntary on/off switch architectures) is detected for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails."	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 3.0 seconds	Diagnostic is enabled.		fail continuously for greater than 3.0 seconds	Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Set/ Coast Signal 2 Circuit	P155B	Detects a failure of the cruise set 2 switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit voltage is stuck in Decrease High state for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with the secondary cruise switch circuit.	Cruise Control Set 2 switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Resume/ Acceleration Signal 2 Circuit	P155C	Detects a failure of the cruise resume 2 switch in a continously applied state "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit voltage is stuck in Increase High state for too long, ECM sets the code and cruise control will be disabled and disengaged for the remainder of the key cycle regardless of current pass/fail condition once it fails." Only applicable for applications with the secondary cruise switch circuit.	Cruise Control Resume 2 switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, 1 Trip No MIL Emissions Neutral , "Emissions Neutral Diagnostics - special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cruise Control Lane Center Switch Circuit	P1589	Detects failure for cruise lane centering control circuit "Emissions Neutral Default Action : When the BCM tells the ECM that the secondary cruise control switch circuit voltage is stuck in the LCC (Lane Centering Control) state for too long, ECM sets the code and adaptive cruise control will be disabled and disengaged for the remainder of the key cycle. Only applicable for applications with the secondary cruise switch circuit and lane centering control.	Lane Center Control switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, 1 Trip No MIL Emissions Neutral, "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.
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.
Speed Limiter On Switch Circuit	P162C	detects failure of speed limiter/ warning momentary on/off switch in the applied state "Emissions Neutral Default Action : When the BCM detects that the momentary cruise on/off switch for Speed Limiter has been applied for too long, the code is set and cruise control is disabled and disengaged for the remainder of the key cycle".	Speed Limiter On switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 20.00 seconds	Diagnostic is enabled. CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 20.00 seconds	Type C, 1 Trip No MIL Emissions Neutral, "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.
Internal Control Module SIDI High Pressure Pump current monitor	P163A	This DTC Diagnoses the current from the control area and compares it with calibrated thresholds to set current high and low flags	SIDI fuel pump High Current Test Current SIDI fuel pump Low Current Test Current	 >= 11.00 Amps <= 0.10 Amps	Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false andEngine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA	>= 11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Current High/ Low 10 seconds failures out of 12.50 seconds sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Ignition voltage out of correlation error(P1682) not active and Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 132		

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 #2	P16A7	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage and the Powertrain Relay Ignition Voltage #2. 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. 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: **P16A7_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.
Engine Controls Ignition Relay Feedback Circuit 2 Low Voltage - (GEN III Controllers ONLY)	P16AF	Detects low voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 2 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >=11.00 >9.00 = ON	5 failures out of 6 samples 1000 ms / sample	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.
Engine Controls Ignition Relay Feedback Circuit 2 High Voltage -(GEN III Controllers ONLY)	P16B3	Detects high voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 2 high voltage	Relay voltage >=4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 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.
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 B, 2 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 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 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 Transmission Range Unknown	P1789	Detects the failure of the ETRS system to identify the current transmission range with sufficient confidence.	Actual Transmission Range	= Undefined	Range Indication Source AND CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= 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 Emissions Neutral

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 Emissions Neutral

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 Emissions Neutral

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 Emissions Neutral

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 Emissions Neutral

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 Emissions Neutral

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 Emissions Neutral

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 Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<=6 V	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/ CRANK	4.5 sec in 5.5 second window	Type B, 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 Ignition1 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 Emissions Neutral

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	>=8.00 >= 0.80* 8.00 <=0.08* 8.00	Not Fault Active Controller is on Park button switch signals: Vehicle Speed	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.
			AND Switch-2-Closed count		Comprehensive correlation diagnostics:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Random Access Memory (RAM) Performance	P18F3	Detects retention RAM failures related to DTC reporting	Invalid data detected in DTC-related retention RAM Stored Normal data	# stored Inverted data		Diagnostic runs one time each power-up. (This DTC runs one time in the Bootloader Software and one time in the Application Software at each power-up)	One 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 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.
Fuel Level Sensor 2 Performance (For use on vehicles with two fuel senders and mechanical transfer pump)	P2066	This DTC will detect a secondary fuel tank level sensor stuck in-range.	1) If Deadband diagnostic subtest Enabled AND 2a) If fuel volume in primary tank is and 2b) if fuel volume in secondary tank is and 2c) and if 2a and 2b indications do not change while fuel volume consumed by engine is	2a) >1,024.0 liters 2b) <2.7 liters 2c) >18.0 liters	Ia) Diagnostic is Disabled Ib) Engine Operational Status	1b) == Running	250 ms / sample	Type B, 2 Trips
			1) If Secondary sensor rationality diagnostic subtest enabled AND 2a) Volume in primary tank is 2b) and volume in secondary tank is 2c) and remains in this condition for	2a) <1,024 liters 2b) > 3 liters 2c) >1,800 seconds	Ia) Diagnostic is Disabled Ib) Engine Operational StatusEngine Running	1b) == Running	250 ms / sample	
			a) If indicated fuel volume change is b) while fuel consumed by the engine is	a) < 3.00 liters b) > 19 liters	Ia) Diagnostic is Enabled Ib) Engine Operational StatusEngine Running 2) Secondary tank volume [Not Empty] is	1b) == Running 2) >2.7 liters	250 ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with two fuel senders connected to an FTZM)	P2067	This DTC will detect a fuel sender out-of-range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10%	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with two fuel senders connected to an FTZM)	P2068	This DTC will detect a fuel level sensor out-of-range high in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 %	a) Diagnostic is Enabled b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	 b) == True c) == True d) <> True	40 failures out of 50 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.
Intake Camshaft Actuator Solenoid Circuit Low-Bank 1	P2088	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	20 failures out of 25 samples 250 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.
Intake Camshaft Actuator Solenoid Circuit High - Bank 1	P2089	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	20 failures out of 25 samples 250 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.
Exhaust Camshaft Actuator Solenoid Circuit Low-Bank 1	P2090	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	20 failures out of 25 samples 250 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.
Exhaust Camshaft Actuator Solenoid Circuit High - Bank 1	P2091	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid 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 0 impedance between signal and controller power	Diagnostic is Enabled System supply voltage Output driver Ignition switch	 > 11.00 Volts On Crank or Run	20 failures out of 25 samples 250 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.
Post Catalyst Fuel Trim System Too Lean Bank 1	P2096	Determines if the post catalyst 02 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2096 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst 02 voltage is too lean, the post catalyst 02 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 29%for>= 1.0 seconds AND the % Authority metric is approaching the failure threshold. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 25% for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 98.0 % >= 62.8 % If the P2096 is actively failing then the Average Integral Offset must be < 98.0 % and the Average Total Offset must be < 62.8 % for the diagnostic to report a pass.	The post cat fuel trim diagnostic is enabled The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Ethanol Estimation in Progress 02 Heater Learned Resistance Long Term Secondary Fuel Trim Enabled for (see **"Long Term Secondary Fuel Trim Enable Criteria"** in Supporting Tables) High Vapor Conditions Green Cat System	 No No Yes No No >= 70 kPa >= 5.0 g/s <= 10,000.0 >= 20 kPa <= 256 -20 deg. C 150 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE) Not Active Not Active Not Active = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") >= 0.1 seconds Not Present = Not Valid,	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 37.5 seconds (375 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).			Condition	Green Cat System condition is considered valid until the accumulated air flow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22 grams/sec.		
					------------------------------	------------------------------		
					Delay during GPF Regeneration If the diagnostic delays during a GPF Regen, it will continue to delay following completion of the Regen until the following number of samples have been accumulated. (1 sample = 100ms):	No Delay		
					Deceleration Idle Cruise Light Acceleration Heavy Acceleration	0.00 0.00 0.00 0.00 0.00		
					------------------------------	------------------------------		
					No Fault Active for:	AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						CamSensorAnyLocationFA EvapEmissionSyste m_FA EvapFlowDuringNonPurge_FA FuelTankPressureSnsrCkt_FA EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance Bankl O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA		
					For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the minimum accumulated samples required before the fuel control metric is considered usable for that cell (1 sample = 100ms):			
					Deceleration Idle Cruise Light Acceleration Heavy Acceleration	100 100 100 100 100		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(Note: A value in any of the above operating "cells" that is an order of magnitude (or more) higher than other cells is an indication that the diagnostic is not capable of diagnosing in that cell).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Post Catalyst Fuel Trim System Too Rich Bank 1	P2097	Determines if the post catalyst 02 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2097 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst 02 voltage is too rich, the post catalyst 02 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 29%for>= 1.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 25% for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	<= -98.0 % <= -70.0 % If the P2097 is actively failing then the Average Integral Offset must be > -98.0 % and the Average Total Offset must be > -70.0% for the diagnostic to report a pass.	Same as P2096	Same as P2096	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 37.5 seconds (375 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		and proportional offset values of "0" (i.e. 0% authority) and a post catalyst 02 sensor that is within its optimal operating range (neither rich nor lean).						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error. This is determined if the difference between measured throttle position and modeled throttle position is greater than a threshold or less than a threshold. This diagnostic only runs when the engine is running and the voltage is high enough and there is not a voltage failure and the throttle position minimum learn is not active and the throttle is being controlled 2) Throttle control is driving the throttle in the incorrect direction. This is determined if the throttle position is greater than a threshold percent and the powertrain relay voltage is high enough and the throttle position minimum learn is active.	Difference between measured throttle position and modeled position, (modeled = MAX (Commanded vs. Commanded Filtered)) > OR Difference between modeled position (modeled = MIN (Commanded vs. Commanded Filtered)) and measured throttle position >	8.48 % 8.48 %	TPS minimum learn is not active AND Powertrain Relay Contactl Fault is FALSE (no P1682 fault) AND Throttle Control is not in Service or DVT control AND Throttle is being Controlled AND ((Engine Running AND Run/Crank Voltage) OR Run Crank Voltage) AND (PT Relay Command On OR ((Engine Running AND Powertrain Relay Voltage) OR Powertrain Relay Voltage)) AND ((Engine shutdown procedure is not complete) OR (Run/Crank signal is	> 5.50 Volts > 8.41 Volts > 5.50 Volts > 8.41 Volts	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active))			
			Throttle Position >	52.71 %	TPS minimum learn active AND Powertrain Relay Contactl Fault is FALSE (no P1682 fault) AND Throttle Control is not in Service or DVT control	= TRUE	11 counts; 12.5 ms/count in the primary processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Return to Default Performance	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	(Normalized TPS1 percent Vref > AND Normalized TPS2 percent Vref> On the main processor) OR (Normalized TPS1 percent Vref < AND Normalized TPS2 percent Vref< On the main processor) (100% corresponds to 5.0 Volt)	2.3810% Vref 2.3840 % Vref 2.0590 % Vref 2.0560 % Vref	Throttle de-energized due to one of the following conditions: Powerup Default Learn OR Default Throttle Authority OR PT Relay Voltage OR Main System Shutdown OR Battery Saver Active OR (Powertrain Relay On AND Run/Crank Active)	= TRUE = TRUE < 5.500 Volts = TRUE = TRUE = FALSE = FALSE	0.4969 s if ETC motor command is STOP (when Default Throttle Authority or Main System Shutdown is causing Throttle de-energize) 5.0000 s if ETC motor command is not STOP	Type B, 2 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. Detect a continuous or intermittent short high in the APP sensor #1 on the Main processor.	APP1 percent Vref > (100% corresponds to 5.0 Volt)	95.00 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	>6.41 Volts P06A3	19/39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detect a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor. 1.) The diagnostic monitors the difference in position between TPS1 and theTPS2 and fails the diagnostic when the difference is too high. This diagnostic only runs when the battery voltage is high enough. 2.) The diagnostic monitors the difference in reference voltage between normalized min TPS1 and the normalized min TPS2 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 TPS sensors #1 and #2 on Main processor	Difference between TPS1 displaced and TPS2 displaced >	6.797%offset at min. throttle position with a linear threshold to 9.720% at max. throttle position	Run/Crank voltage No TPS sensor faults No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts (P0122, P0123, P0222, P0223) P06A3	79/159 counts; or 58 counts continuous; 3.125 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min TPS1) and (normalized min TPS2) > (100% corresponds to 5.0 Volt)	5.000 % Vref	Run/Crank voltage No TPS sensor faults No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts (P0122, P0123, P0222, P0223) P06A3	79/159 counts; or 58 counts continuous; 3.125 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.
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 faulst for # 3 & # 4 5V reference circuits	> 6.41 Volts (P2122, P2123.P2127, P2128) (P06A3, P0697)	19/39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min APP1) and (normalized min APP2) >	5.000 % Vref	Run/Crank voltage No APP sensor faults No 5V reference errors or faulst for # 3 & # 4 5V reference circuits	> 6.41 Volts (P2122, P2123.P2127, P2128) (P06A3, P0697)	19/39 counts intermittent; or 15 counts continuous, 12.5 ms/count in the main processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector 1 high side circuit shorted to ground	P2147	Controller specific output driver circuit diagnoses Injector 1 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to power	P2148	Controller specific output driver circuit diagnoses Injector 1 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.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to ground	P2150	Controller specific output driver circuit diagnoses Injector 2 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to power	P2151	Controller specific output driver circuit diagnoses Injector 2 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.	 <= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Injector3 high side circuit shorted to ground	P2153	Controller specific output driver circuit diagnoses Injector 3 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Injector3 high side circuit shorted to power	P2154	Controller specific output driver circuit diagnoses Injector 3 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.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to ground	P2156	Controller specific output driver circuit diagnoses Injector 4 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.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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 high side circuit shorted to power	P2157	Controller specific output driver circuit diagnoses Injector 4 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.	 <= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >= 1 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 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.
Minimum Throttle Position Not Learned	P2176	Detect when the throttle position minimum learn on the main processor is not learned. This diagnostic detects this by monitoring if the throttle position is greater than a threshold and the number of learn attempts is greater than a threshold. This diagnostic only runs when the battery voltage is high enough and the throttle position minimum learn is active. Throttle position sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS percent Vref > AND Number of learn attempts > (100% corresponds to 5.0 Volt)	11.48% Vref 10 counts	Run/Crank voltage TPS minimum learn is active No previous TPS min learn values stored in long term memory	> 6.41 Volts = TRUE	2.0 secs	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 2 Circuit Low	P2184	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	< X Ohms X is equal to: Temp Sensor 1: 55 Ohms Temp Sensor 2: 55.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 55.0 Ohms Temp Sensor 5: 41.1 Ohms Temp Sensor 6: 55.0 Ohms Temp Sensor 7: 55.0 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	P2185	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	> X Ohms X is equal to: Temp Sensor 1: 174,069 Ohms Temp Sensor 2: 174,069 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 174,069 Ohms Temp Sensor 5: 354,667 Ohms Temp Sensor 6: 174,069 Ohms Temp Sensor 7: 174,069 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	P2186	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr2 Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 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 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6 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 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 10.0 seconds -60.0 °C 150.0 °C 10.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 7.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 5.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Bank 1 Air-Fuel Ratio Imbalance	P219A	This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on Bank 1. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst 02 voltage is used to generate a variance metric that represents the statistical variation of the 02 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without). The observed Variance is dependent on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table	Standard Mode Filtered Ratio The EWMA calculation uses the weighting coefficient from the following supporting table: **P219A EWMA Coefficient** For this program, the Optional Mode is NOT used Optional Mode Filtered Ratio The EWMA calculation uses the weighting coefficient from the following supporting table while in Optional Mode:	>0.50 If the diagnostic has reported a failure on the prior trip, the EWMA Filtered Ratio must fall below 0.45 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing. > 1.00 If the diagnostic has reported a failure on the prior trip, the Optional Mode Filtered Ratio must fall below 0.50 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing.	The A/F imbalance diagnostic is enabled System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF	 No lower than 10.5 Volts for more than 0.2 seconds > 10.0% The diagnostic will disregard the fuel level criteria if the fuel sender is faulty. >-20 deg. C(orOBD Coolant Enable Criteria = TRUE) > 0.0 seconds No 1,100 to 4,000 RPM <180 RPM 5 to 1,000 g/s <4 g/s <0.75 g/s	Minimum of 1 test per trip, up to 10 tests per trip during RSR or FIR. The front 02 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 16.80 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		P219A Variance Threshold Bankl Table) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17x17 table (see Supporting Table **P219A Normalizer Bankl Table).** This quotient is then multiplied by a quality factor calibration from a 17x17 table (see Supporting Table **P219A Quality Factor Bankl Table)** . This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered	**P219A EWMA Coefficient Opt Table**		= 0.100		made within 5 minutes of operation. For RSRorFIR, 20 tests must complete before the diagnostic can report.	
					Air Per Cylinder (APC)	160 to 650 mg/cylinder		
					APC delta during short term sample period	<75mg/cylinder		
					Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.100	<10.00 percent		
					Spark Advance	0 to 100 degrees		
					Throttle Area (percent of max)	2 to 200 percent		
					Intake Cam Phaser Angle	0 to 100 degrees		
					Exhaust Cam Phaser Angle	0 to 100 degrees		
					---------------------------------	---------------------------------		
					Electronic Waste Gate (eWG) present	Yes		
					If eWG = yes then Waste Gate Position	-5.0 to 105.0		
					Intrusive eWG Feature	Disabled		
					If intrusive Waste Gate positin is enabled then the electronic Waste Gate will be commanded to the following range when the other enable conditions have been met.			
					Intrusive Waste Gate Position Min	25.0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use his feature. For programs using Active Fuel Management or Multiple Cam profiles, a secondary Imbalance Ratio can be calculated while in the secondary operating modes. This secondary ratio is an optional calculation and is labeled as the "Optional Mode Ratio". The Optional Mode Ratio is calculated the same as explained above with the following supporting			Intrusive Waste Gate Position Max ---------------------------------- Delay during GPF Regeneration ---------------------------------- Active Fuel Management Firing Fraction if the Optional Mode is enabled (see Malfunction Criteria) Active Fuel Management Firing fraction for Optional Mode calculations Intrusive Firing Fraction during Fast Initial Response or Rapid Step Response If the intrusive Firing Fraction feature is enabled the Active Fuel Management firing fraction will be forced to a value above this threshold when in Fast Initial Response or in Rapid Step Response. -------------------------------- For programs using multi-step cam profiles: High Lift Cam Profile will use:	100.0 --------------------------------- No Delay --------------------------------- 0.99 to 1.01 1.10 to 0.00 Disabled >=0.00 -------------------------------- Standard Mode Filtered Ratio		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		tables: **P219A Variance Threshold Bankl Opt Table** , **P219A Normalizer Bankl Opt Table** , and **P219A Quality Factor Bankl Opt Table**			Low Lift Cam Profile will use:	Standard Mode Filtered Ratio		
					Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table **P219A Quality Factor Bankl Table).** QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data.	>=0.99		
					Fuel Control Status Closed Loop and Long Term FT Enabled for:	>= 1.2 seconds (Please see **"Closed Loop Enable Clarification"** and **"Long Term FT Enable Criteria"** in Supporting Tables)		
					Device Control	Not active		
					AIR pump	Not on		
					CASE learn	Not active		
					EGR	Not intrusive		
					EVAP	Not intrusive		
					Engine Over Speed Protection	Not Active		
					Idle speed control	Normal		
					PTO	Not Active		
					Injector base pulse width	Above min pulse limit		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					02 learned htr resistance	= Valid (the 02 heater resistance has learned since NVM reset)		
					Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by	>= 0.50 >=0.50		
					Once triggered, the filtered ratio is reset to:	0.00		
					Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to:	0.00		
					No Fault Active for:	MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA FuelTrimSystemB1_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						WRAF_Bank_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Low (applications with LIN MAF)	P2228	Detects an eroneously low value being reported over the LIN serial connection from the BARO sensor. The diagnostic monitors the BARO sensor pressure output and fails the diagnostic when the pressure is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO Pressure	< 50.0 kPa	Diagnostic is Enabled LIN communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit High (applications with LIN MAF)	P2229	Detects an eroneously high value being reported over the LIN serial connection from the BARO sensor. The diagnostic monitors the BARO sensor pressure output and fails the diagnostic when the pressure is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO Pressure	> 110.0 kPa	Diagnostic is Enabled LIN communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure (BARO) Sensor Circuit Intermittent (applications with LIN MAF)	P2230	Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected. When the value of BARO in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO readings. The result of this summation is called a “string length”. Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 25 milliseconds previous)	> 100 kPa 40 consecutive BARO readings	Diagnostic is Enabled LIN communications established with MAF		4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Circuit/Open Bank 1 Sensor 1 (WRAF& Gen4 ECM	P2237	This DTC determines if theB1S1 WRAF 02 Sensor Pump Current signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the pumping current circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is < 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete). **************************	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips
			B1S1 WRAF ASIC indicates a Open circuit on the Pump Current circuit signal. Open fail counts are accumulated to determine fault status. This application uses the following type of WRAF sensor: For NGK_ZFAS_U2 For Bosch_LSU_4p9	The ASIC provides a fault indication when the pumping current circuit fails the following criteria; Based on the type of WRAF sensor used; CeWRSG_e_NGK_ZFAS_U2_2p1 element resistance > 400 ohms pump cell reference resistance > Nernst	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete). **************************	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	reference resistance Note: the faults must exist for more than 10 msec to qualify for a fail flag.				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Performance Bank 1 (WRAF minus E80 ECM	P223C	This DTC determines if the WRAF 02 sensor pumping current has an incorrect or out of range value. This DTC will detect open circuit faults to the Pump current, Ref Cell voltage, Ref Ground circuits. When enabled, the diagnostic monitors the pumping current in three different fault regions during DFCO. The individual diagnostic failure counters are incremented based on the diagnostic results in each region. The DTC is set based on any of the three individual fail and sample counters.	Fault condition present when the pump current is in any of the fault regions when this test is enabled during DFCO.	The three pump current fault regions are: A) Pump current >5.00 ma B) Pump current < 0.30 ma and > -0.30 ma C) Pump current < -0.10 ma The three fault regions have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) ************************** Test starts when time in DFCO Test stops when time in DFCO	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds **DFCO Active Minimum > Time (seconds)** in the Supporting Tables > **DFCO Active Maximum Time (seconds)** in the Supporting Tables	Region A: 128 failures out of 160 samples OR Region B: 128 failures out of 160 samples OR Region C: 128 failures out of 160 samples Sample rate is 25 msec. Test enabled during DFCO.	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 Reference Resistance Out Of Range Bank 1 (WRAF Sensor 1 Or Switching w EIC Sensor 1	P223E	This DTC determines if the WRAF 02 sensor reference cell has an incorrect or out of range resistance value. This test compares the element's resistance (from the WRAF sensor Application-Specific Integrated Circuit (ASIC)) to the expected values for the enabled condition. The element temperature is directly related to the element resistance based on the released sensor element specifications. The diagnostic failure counter is incremented if the element temperature is outside the expected range. This DTC is set based on the fail and sample counters.	Measured Reference cell temperature	< 650 Deg C OR >1,000.0 Deg C	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then Delay after WRAF circuit diagnostic delay **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds	128 failures out of 160 samples Sample rate is 25 msec Continuous	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 Reference Voltage Circuit/Open Bank 1 Sensor 1 (WRAF & Gen4 ECM	P2243	This DTC determines if theB1S1 WRAF 02 Reference Voltage signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the reference voltage circuit pin is open, or reference cell voltage is > 1.2V and pump cell voltage is < 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete). **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips
			B1S1 WRAF ASIC indicates a Open circuit on the Reference Voltage circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	The ASIC provides a fault indication when the reference voltage circuit fails the following criteria; |Nernst signal - 0.45| >1.0 volts Note: the faults must exist for more than 10 msec to qualify for a fail flag.	DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete). **************************	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Reference Ground Circuit/Open Bank 1 Sensor 1 (WRAF& Gen4 ECM	P2251	This DTC determines if theB1S1 WRAF 02 Reference Ground signal circuit is Open. When enabled, the diagnostic monitors the failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The diagnostic failure counter is incremented based on the fault bit message received from the ASIC. The DTC is set based on fail and sample counters.	B1S1 WRAF ASIC indicates a Open circuit on the Reference Ground circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as ATIC142 (Continental).	The ASIC provides a fault indication when the reference ground circuit pin is open, or pump cell voltage is > 1.2V and reference cell voltage is > 1.2V Note: the fault must exist for previous 2.5 seconds, it is split in two stages, a passive stage of 1.875 seconds and an active stage of 0.625 seconds.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	 WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			B1S1 WRAFASIC indicates a Open circuit on the Reference Ground circuit signal. Open fail counts are accumulated to determine fault status. Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	The ASIC provides a fault indication when the reference ground circuit fails the following criteria; CJ136 H/W detection Note: the faults must exist for more than 10 msec to qualify for a fail flag.	Diagnostic is Enabled DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ************************** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **************************	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete > 20.0 seconds	20 failures out of 24 samples Continuous in 25 milli - second loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Turbo/Super Charger Bypass Valve - Mechanical Turbocharger with wastegate. Not supercharger with mechanical compressor	P2261	This DTC indicates the compressor recirculation valve being stuck closed. This diagnostic is active at coast down let off conditions, where an airflow pulsation criteria is used as basis of this diagnostic.	When measuring time accumulated air mass flow derivate boost pressure is high pass filtered with filter frequency ***************************** A failure is detected when Acc. Filtered Air Mass Flow or Acc.Der.Filtered boost pressure	< 1.00 Second, = 10.91 Hz ************************* >120.00 g/s >50,000.00 kPa/s	Diagnostic enabled ***************************** Engine speed ***************************** Bypass valve commanded open duty cycle For at least ***************************** Pressure ratio over the compressor relative limit Condition keep true for x seconds extra ***************************** Negative transient -> TRUE Relative boost and Pressure derivate Hysteresis negative transient -> FALSE Relative boost or Pressure derivate ***************************** No Active DTCs:	True ***************************** >= 1,200 rpm ***************************** >10.00% >= 0.30 s ***************************** > refer to **P00C4 P2261: Compressor Surge Line** in Supporting Tables 1.00 s ***************************** TRUE >=20.00 kPa <=-160.00 kPa/s <0.00 kPa >65.00 kPa/s ***************************** BSTR_b_TurboBypassCktFA BSTR_b_BoostSnsrFA MAF_SensorFA	4 Failed tests out of 5 tests 25ms/ sample	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 Signal Stuck Lean Bank 1 Sensor 2	P2270	The P2270 diagnostic is the first in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Lean Voltage Test	< 850mvolts > 400 grams	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemBl TFTK 0 FuelTrimSystemB2 TFTK 0 EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013A, P013B, P013E, P013F, P2270 or P2271 >10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "H02S Heater Resistance DTCs") = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations:	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low Fuel Condition	B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					Only when FuelLevelDataFault	= False		
					Pedal position	= False		
					Engine Airflow	< 3.0 %		
					Closed loop integral	2.0 < gps < 20.0		
					Closed Loop Active	0.80 < C/L Int < 1.08		
					Evap	= TRUE (Please see **“Closed Loop Enable Clarification”** in Supporting Tables).		
					Ethanol Estimation in Progress	not in control of purge		
					Post fuel cell	= Not Active (Please see **“Ethanol Estimation in Progress”** in Supporting Tables).		
					Crankshaft Torque	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					EGR Intrusive diagnostic	<75.0Nm		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	= not active		
					Transmission Temp	> 60.0 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Predicted Catalyst temp Fuel State ================= All of the above met for at least 0.0 seconds, and then check the following Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) ================= All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested. ================= During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	> -40.0 °C 500 < °C < 850 = DFCO possible ================== 1,100 < RPM < 3,000 1,000 < RPM < 3,100 34.2 < MPH < 80.8 31.1 < MPH < 87.0 0.95 < EQR < 1.10 <60.0 Nm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	The P2271 diagnostic is the fourth in a sequence of six intrusive secondary 02 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, &P013B. ThisDTC determines if the secondary 02 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary 02 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached.	Post 02 sensor signal AND The Accumulated mass airflow monitored during the Stuck Rich Voltage Test	> 100 mvolts >25.0 grams	Diagnostic is Enabled No Active DTCs B1S2 DTCs Not Active this key cycle System Voltage Learned heater resistance Green 02S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemBI TFTK 0 FuelTrimSystemB2 TFTK 0 EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013A, P013B, P013E, P013F or P2270 >10.5 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green 02S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations:	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Low Fuel Condition Only when FuelLevelDataFault Fuel State DTC's Passed ================== After above conditions are met: DFCO mode is continued (w/o driver initiated pedal input).	B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = False = False = DFCO possible = P2270 = P013E = P013A =================		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor C Circuit Low	P227C	Detects an eroneously low value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO C Pressure	< 50.0 kPa	Diagnostic is Enabled LIN communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor C Circuit High	P227D	Detects an eroneously high value being reported over the LIN serial connection from the BARO C sensor. The diagnostic monitors the BARO C sensor pressure output and fails the diagnostic when the pressure is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure. The BARO C pressure value is transmitted to the ECM by the MAF sensor using the LIN serial communication protocol.	BARO C Pressure	> 110.0 kPa	Diagnostic is Enabled LIN communications established with MAF		160 failures out of 200 samples 1 sample every 25 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic	P227E	Detects a noisy or erratic signal in the barometric pressure (BARO) C circuit by monitoring the BARO C sensor and failing the diagnostic when the BARO C signal has a noisier output than is expected. When the value of BARO C in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO C readings. The result of this summation is called a “string length”. Since the BARO C signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO C signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO C reading - BARO C reading from 25 milliseconds previous)	> 100 kPa 40 consecutive BARO C readings	Diagnostic is Enabled LIN communications established with MAF		4 failures out of 5 samples Each sample takes 1.0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance	P228C	This DTC determines if the high pressure pump is not able to maintain target pressure. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	>= **P228C P2C1F-High Pressure Pump Control (HPC) fail threshold of pressure too low** Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable	True	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips
					Battery Voltage	>=11 Volts		
					Low Side Fuel Pressure	> 0.275 MPa		
					Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and	Enabled when a code clear is not active or not exiting device control Engine is not cranking		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	>= 70.0 KPA >=-20.0 degC -12<=Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance	P228D	This DTC determines if the high pressure pump is delivering high pressure that desired pressure. The fault is set if the measured fuel rail pressure is higher than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	<= **P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high** Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable	True	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips
					Battery Voltage	>=11 Volts		
					Low Side Fuel Pressure	>0.275 MPa		
					Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement	Enabled when a code clear is not active or not exiting device control Engine is not cranking		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -20.0 DegC -12 <= Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #1 CIRCUIT LOW	P2300	Diagnoses Cylinder #1 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 0 impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #1 CIRCUIT High	P2301	Diagnoses Cylinder #1 Ignition Control (E8T) output driver circuit for a Short to Power fault. Controller specific output driver circuit diagnoses the 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.	< 100 0 impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT Low	P2303	Diagnoses Cylinder #2 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 0 impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #2 CIRCUIT High	P2304	Diagnoses Cylinder #2 Ignition Control (E8T) output driver circuit for a Short to Power fault	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.	< 100 0 impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #3 CIRCUIT Low	P2306	Diagnoses Cylinder #3 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 0 impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #3 CIRCUIT High	P2307	Diagnoses Cylinder #3 Ignition Control (E8T) output driver circuit for a Short to Power fault	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.	< 100 0 impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT Low	P2309	Diagnoses Cylinder #4 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the 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 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.	< 100 0 impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
IGNITION CONTROL #4 CIRCUIT High	P2310	Diagnoses Cylinder #4 Ignition Control (E8T) output driver circuit for a Short to Power fault	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.	 < 100 0 impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	20 Failures out of 25 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Position Sensor Circuit Low	P23C4	Circuit Continuity This DTC detects a short to ground in the position sensor signal circuit. This is accomplished by monitoring the reported position. If the position goes out of the expected range the DTC is set.	Engine Coolant Bypass Valve C Positions Sensor SENT digital read value	<50	Diagnostic is Enabled SENT communitation is not in error Run Crank Ignition in Range Engine not cranking Engine Diag System	 VECR_MRV_LoC_FP = True = True = Enabled	4 seconds out of a 5 seconds window	Type 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 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 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 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	8.1A < 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.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the ECM run/ crank is active.	Ignition switch Run/Start position circuit low	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	106 failures out of 132 samples 25 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the ECM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	320 failures out of 400 samples 25 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message 2's complement not equal ($189/$199) OR Rolling count error - Serial Communication message ($189/$199) rolling count index value OR Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase OR Multi-transition error - Trans torque intervention type request change	Message <> two's complement of message Message <> previous message rolling count value + one > 350 Nm Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic Status Power Mode Ignition Voltage Engine Running Run/Crank Active No Serial communication loss to TCM (U0101)	Enabled = Run > 6.41 volts = True > 0.50 Sec No loss of communication	>=16 failures out of 20 samples. Performed on every received message >= 6 Rolling count errors out of 10 samples. Performed on every received message >=6 range errors out of 10 samples. Performed on every received message >=5 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Hood Switch Performance	P257D	This DTC monitors the hood switch rationality	Hood Switch position is in an invalid position. The hood switch reading is invalid in these ranges. Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	 43.4% to 45.7% 59.34% to 66.96%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Hood Switch Short to Ground / Low Voltage	P257E	This DTC monitors the hood switch for a short to ground or low voltage condition	Hood Switch position reading is lower than an expected bounds for The hood switch reading is lower than expected bounds at: Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	< 17.2% < 28.54%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL Ilium.**
Engine Hood Switch Short to Voltage / High Voltage	P257F	This DTC monitors the hood switch for a short to voltage or high voltage condition	Hood Switch position reading is higher than an expected bounds for The hood switch reading is higher than expected bounds at: Hood Switch Type: CeVIOS_e_GlobalB If Hood Switch type is CeVIOS_e_GlobalA If Hood Switch type is CeVIOS_e_GlobalB	 > 67.8% > 85.2%	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	Enabled Use Run/Crank as Enable	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
02 Sensor Pumping Current Trim Circuit/Open Bank 1 Sensor 1 ((WRAF & E81 ECM) Or (WRAF & Gen4 ECM)	P2626	This DTC determines if the WRAF 02S trim circuit is open. The trim circuit fine tunes the WRAF 02S pump current signal. The diagnostic is an Application-Specific Integrated Circuit (ASIC) intrusive test which runs when the Run/Crank signal changes from False to True. The diagnostic failure counter is incremented if the ASIC test fails and the enable conditions are met. This DTC is set based on the fail and sample counters.	B1S1 Trim circuit Open test. This application uses the following type of WRAF sensor: The ASIC Open trim test detects a fault if the trim circuit resistance is: For NGK_ZFAS_U2 For Bosch_LSU_4p9 Note: This ASIC is referred to as ATIC142 (Continental).	CeWRSG_e_NGK_ZFAS_U2_2p1 > 4,644 ohms > 379.5 ohms	Diagnostic is Enabled DTC's Not active this key cycle Run/Crank Signal WRAF circuit diagnostic delay (since heater Warm-up delay is complete) Fuel Control State Off Stoich Closed Loop DFCO WRAF Pump current	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 changes from false to true > 20.0 seconds = Closed Loop = Not active = Not active < 1.0 ma	1 fail counts out of 1 samples 25 ms /sample Continuous	Type B, 2 Trips
			B1S1 Trim circuit Open test. This application uses the following type of WRAF sensor: The ASIC Open trim test detects a fault if the trim circuit resistance is: For NGK_ZFAS_U2 For Bosch_LSU_4p9	CeWRSG_e_NGK_ZFAS_U2_2p1 < 118 ohms or > 4K ohms <30 ohms or >300 ohms AND	Diagnostic is Enabled DTC's Not active this key cycle Run/Crank Signal WRAF circuit diagnostic delay (since heater Warm-up delay is complete) Fuel Control State Off Stoich Closed Loop DFCO WRAF Pump current	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 changes from false to true > 20.0 seconds = Closed Loop = Not active = Not active	1 fail counts out of 1 samples 25 ms /sample Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Note: This ASIC is referred to as CJ136 (next Gen version of CJ135 from Bosch).	Pump current circuit not detected open		< 1.0 ma		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Bypass Valve C Control Circuit/Open	P26B7	Controller specific output driver circuit detects an open circuit in the load circuit for the Engine Coolant Bypass Valve C when the H-Bridge is energized.	Driver reports an open control cirucit condition	= TRUE	Diagnostic is Enabled Run Crank Ignition in Range Engine not cranking Engine Diag System Driver control circuit open status is not	 = True = True = Enabled = Indeterminate	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Stuck Open	P26C0	This diagnostic detects the performance of the Block Rotary Valve, bounded by the two mechanical endstops. It monitors the difference between raw position feedback and position request. If the enable criteria are met and the position difference exceeds the failed threshold and the raw position feedback reports a value that is above the calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met.	Absolute value of the position difference between position request and position feedback AND Coolant Valve Position Feedback	>= 5.00° >= 50.00°	Diagnostic is Enabled The following shall be satisfied for [12V System Voltage VECR_BRV_PstnFdbk_Av, VECR_BRV_PstnFdbk_Fol, VECR_BRV_CktLo_FP, VECR_BRV_CktHi_FP VECR_BRV_CktLo_FA, VECR_BRV_CktHi_FA PowertrainRelayStateOn_FA , Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Coolant Valve Position Command If Use Engine Block Coolant Temperature is TRUE, then the following shall be used [Engine Block Coolant Enable Temperature] Coolant Valve Calibration	 >= 0.10 seconds >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = No Fault Active = True = between -5.00 ° and 115.00° = 1.00 >= -34.00 °C (hystersis disable <= -35.00 °C) Has not been triggered for	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run**	greater than 37.00 seconds		
					Change in Two Consecutive Coolant Valve Position Command]	<= 5.00 ° for more than 3.00 seconds		
					** Calibration run is a set of pre-defined valve movements for calibrating the position sensor and learning the position of the endstops.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Block Coolant Valve Stuck Closed	P26C2	This diagnostic detects the performance of the Block Rotary Valve, bounded by the two mechanical endstops. It monitors the difference between raw position feedback and position request. If the enable criteria are met and the position difference exceeds the failed threshold and the raw position feedback reports a value that is below the calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met.	Absolute value of the position difference between position request and position feedback AND Coolant Valve Position Feedback	>= 5.00° < 50.00°	Diagnostic is Enabled The following shall be satisfied for [12V System Voltage VECR_BRV_PstnFdbk_Av VECR_BRV_PstnFdbk_Fol VECR_BRV_CktLo_FP, VECR_BRV_CktHi_FP VECR_BRV_CktLo_FA, VECR_BRV_CktHi_FA PowertrainRelayStateOn_FA , Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Coolant Valve Position Command If Use Engine Block Coolant Temperature is TRUE, then the following shall be used [Engine Block Coolant Enable Temperature] Coolant Valve Calibration	 >= 0.10 seconds >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = No Fault Active = True = between -5.00 ° and 115.00° = 1.00 >= -34.00 °C (hystersis disable <= -35.00 °C)	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Run**	Has not been triggered for greater than 37.00 seconds		
					Change in Two Consecutive Coolant Valve Position Command]	<= 5.00 ° for more than 3.00 seconds		
					** Calibration run is a set of pre-defined valve movements for calibrating the position sensor and learning the position of the endstops.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Pump Overspeed	P26CE	The purpose of the performance diagnostic is to detect and report a failure of the component. If the enable criteria are met, the difference between the commanded speed and the component actual speed is calculated. An overspeed condition is when the commanded speed is less than the component actual speed. The speed difference is filtered and when the difference is less than the overspeed calibrated fault threshold, the diagnostic reports a FAIL. If filtered speed difference does not exceed the overspeed calibrated fault threshold, the diagnostic reports a PASS. The diagnostic will continue to report as long as the enablement criteria are met. There are two different failure criteria as the pump feedback speed is dependent on the system voltage.	Any of the following fail criteria is met: **Criterial:** Filtered (Pump Command Speed - Pump Feedback Speed) 12V System Voltage **Criteria 2:** Filtered (Pump Command Speed - Pump Feedback Speed) 12V System Voltage	**P26CE Pump Overspeed Fail < Threshold** >= -9,999.00 V **P26CE Pump Overspeed Fail Threshold Low < Voltage** < -9,999.00 V	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_EMP_SpeedOORL_FP PECR_EMP_SpeedOORH_FP **Criteria 2:** Calibration to use fault pending is FALSE If either condition is achieved PECR_EMP_SpeedOORL_FA AND PECR_EMP_SpeedOORL_TFTKO OR PECR_EMP_SpeedOORH_FA AND PECR_EMP_SpeedOORH_TFTKO ==================	<50.00 RPM for >= 3.00 s = 1.00(1 is TRUE) = Not Active = 1.00 (0 is FALSE) = 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.
					PECR_MainCoolPmpSpdAct_Av PECR_MainCoolPmpSpdAct_Fol	= Not Active		
					EECR_EngineInlet_FA	= Not Active		
					Engine Inlet Coolant Temperature	>= -40.00 °C		
					All of the following criteria are met for	**P2B85 26CE Pump Speed Performance > Initialization Delay**		
					12V System Voltage	> 11.00 V (with hysteresis disable <10.00 V)		
					Pump Command Speed	>= 300.00 RPM		
					Pump Enable	= True		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Starter Relay Drive Pinion Circuit Open (12VSS)	P26E4	Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay 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 relay pinion diag enable Engine speed Run Crank voltage	Enabled >=0.00RPM >= 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 Drive Pinion Circuit Low Voltage (12VSS)	P26E5	Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and controller ground	Starter control diag enable Engine speed Run Crank voltage	Enabled >=0.00RPM >= 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 Drive Pinion Circuit High Voltage (12VSS)	P26E6	Controller specific output driver circuit diagnoses the Tandem Starter Pinion 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 Engine speed Run Crank voltage	Enabled >=0.00RPM >= 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.
Engine Coolant Bypass Valve Position Sensor Circuit Low Voltage	P29FA	This diagnostic continuously detects if the Block Rotary Valve Position Feedback signal is too low and out of the expected operating range, defined by any position below the lower mechanical end-stop. If the enable criteria are met and the raw position feedback is below the out of range low position fail threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met. This diagnostic will suspend when a matured fault is detected while the valve is performing the integrity check and will re-enable when the valve performs the integrity check again at the end of the next drive cycle.	Coolant Valve Position Feedback	< -13.00°	Diagnostic is Enabled 12V System Voltage VECR_BRV_PstnFdbk_Av, VECR_BRV_PstnFdbk_Fol PowertrainRelayStateOn_FA, Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Diagnostic Position Override Enable	 >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = True = False	4 seconds out of a 5 seconds window	Type 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 Position Sensor Circuit High Voltage	P29FB	This diagnostic continuously detects if the Block Rotary Valve Position Feedback signal is too high and out of the expected operating range, defined by any position above the upper mechanical endstop. If the enable criteria are met and the raw position feedback is greater than the out of range high fail threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met. This diagnostic will suspend when a matured fault is detected while the valve is performing the integrity check and will re-enable when the valve performs the integrity check again at the end of the next drive cycle.	Coolant Valve Position Feedback	> 123.00°	Diagnostic is Enabled 12V System Voltage VECR_BRV_PstnFdbk_Av, VECR_BRV_PstnFdbk_Fol PowertrainRelayStateOn_FA, Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Diagnostic Position Override Enable	 >= 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = True = False	4 seconds out of a 5 seconds window	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Wastegate Position Sensor "A" Circuit Low	P2AB8	Detects a continuous or intermittent short low or open in eWG position circuit by monitoring the eWG position sensor percent Vref and failing the diagnostic when the eWG percent Vref is too low. This diagnostic only runs when powertrain relay voltage is high enough. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Raw position value	< 1.0 %	Diagnostic enabled Powertrain relay voltage Engine does not crank Diagnostic system not disabled	True >=11.0 Volts	10 failures out of 12 samples 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.
Wastegate Position Sensor "A" Circuit High	P2AB9	Detects a continuous or intermittent short high in eWG position circuit by monitoring the eWG position sensor percent Vref and failing the diagnostic when the eWG percent Vref is too high. This diagnostic only runs when powertrain relay voltage is high enough. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Raw position value	> 99.0 %	Diagnostic enabled Powertrain relay voltage Engine does not crank Diagnostic system not disabled	True >=11.0 Volts	10 failures out of 12 samples 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.
Cylinder 1 Injection Pulse Performance	P2B00	Diagnostic to determine if any of the commanded injection pulses for cylinder 1 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P2B01	Diagnostic to determine if any of the commanded injection pulses for cylinder 2 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P2B02	Diagnostic to determine if any of the commanded injection pulses for cylinder 3 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 Injection Pulse Performance	P2B03	Diagnostic to determine if any of the commanded injection pulses for cylinder 4 was not delivered due to the injector pintle/ armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Cylinder 1 Injection Pulse Performance	P2B08	Diagnostic to determine if any of the commanded injection pulses for cylinder 1 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Cylinder 2 Injection Pulse Performance	P2B09	Diagnostic to determine if any of the commanded injection pulses for cylinder 2 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Cylinder 3 Injection Pulse Performance	P2B0A	Diagnostic to determine if any of the commanded injection pulses for cylinder 3 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Cylinder 4 Injection Pulse Performance	P2B0B	Diagnostic to determine if any of the commanded injection pulses for cylinder 4 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/ armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	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 5 Circuit Low	P2B2D	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	< X Ohms X is equal to: Temp Sensor 1: 55 Ohms Temp Sensor 2: 55.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 55.0 Ohms Temp Sensor 5: 41.1 Ohms Temp Sensor 6: 55.0 Ohms Temp Sensor 7: 55.0 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 5 Circuit High	P2B2E	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6	> X Ohms X is equal to: Temp Sensor 1: 174,069 Ohms Temp Sensor 2: 174,069 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 174,069 Ohms Temp Sensor 5: 354,667 Ohms Temp Sensor 6: 174,069 Ohms Temp Sensor 7: 174,069 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.
Intake Camshaft Profile Actuator 2 Control Circuit Open	P2B33	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 2 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 2 Control Circuit Low Voltage	P2B34	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 2 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 2 Control Circuit High Voltage	P2B35	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 2 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 2 Circuit Open	P2B39	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 2 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 2 Circuit Low Voltage	P2B3A	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 2solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 2 Circuit High Voltage	P2B3B	Controller specific output driver circuit diagnoses the Exhasut Camshaft Profile Actuator 2 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 2 Performance	P2B4F	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 2	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled System voltage Engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 2 Performance	P2B51	An unintended pin firing without controller command. Exhaust Camshaft Profile Actuator 2	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled System voltage Engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 2 Pin Stuck	P2B53	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 2 fora pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00) If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00, but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled System voltage Engine running	 > 11.00 Volts = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Wastegate Position Sensor "A" Circuit Performance	P2B81	Detects a performance failure on the electronic wastegate acutuator system The diagnose will fail if at least one of supervision fails. * Position deviation supervision * Actuator current supervision * Actuator Duty Cycle supervision In series applications, turbocharger 'A is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A is associated with engine bank 1.	Actuator is in Normal operation Abs(Position Error) for at least	>10.0% >2.0 sec	Diagnostic enabled ***************************** Engine not in crank mode Engiene is not in cold start conditions Diagnostic system not disabled Device control Component test not active	True *****************************	29 failures out of 30 samples 100ms /sample	Type A, 1 Trips
			Abs(Actuator current) for at least	>1.0A > 1.0 sec	Diagnostic enabled ***************************** Engine not in crank mode Engiene is not in cold start conditions Diagnostic system not disabled Device control Component test not active	True *****************************	29 failures out of 30 samples 100ms /sample	
			Abs(Actuator DC) for at least	>40.0% DC > 1.0 sec	Diagnostic enabled ***************************** Engine not in crank mode Engiene is not in cold start conditions Diagnostic system not disabled Device control Component test not active	True *****************************	29 failures out of 30 samples 100ms /sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Pump Underspeed	P2B85	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 underspeed condition is when the commanded speed is greater than the component actual speed. The speed difference is filtered and when the difference is greater than the underspeed calibrated fault threshold, the diagnostic reports a FAIL. If filtered speed difference does not exceed the underspeed calibrated fault threshold, the diagnostic reports a PASS. The diagnostic will continue to report as long as the enablement criteria are met. There are two different failure criteria as the pump feedback speed is dependent on the system voltage.	Any of the following fail criteria is met: **Criterial:** Filtered (Pump Command Speed - Pump Feedback Speed) 12V System Voltage **Criteria 2:** Filtered (Pump Command Speed - Pump Feedback Speed) 12V System Voltage	**P2B85 Pump Underspeed Fail > Threshold** >= -9,999.00 V **P2B85 Pump Underspeed Fail Threshold Low > Voltage** < -9,999.00 V	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_EMP_SpeedOORL_FP PECR_EMP_SpeedOORH_FP **Criteria 2:** Calibration to use fault pending is FALSE If either condition is achieved PECR_EMP_SpeedOORL_FA AND PECR_EMP_SpeedOORL_TFTKO OR PECR_EMP_SpeedOORH_FA AND PECR_EMP_SpeedOORH_TFTKO ==================	<50.00 RPM for >= 3.00 s = 1.00(1 is TRUE) = Not Active = 1.00 (0 is FALSE) = 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.
					PECR_MainCoolPmpSpdAct_Av PECR_MainCoolPmpSpdAct_Fol EECR_EngineInlet_FA	= Not Active		
					Engine Inlet Coolant Temperature	>= -40.00 °C		
					All of the following criteria are met for	**P2B85 26CE Pump Speed Performance > Initialization Delay**		
					12V System Voltage	> 11.00 V (with hysteresis disable < 10.00 V)		
					Pump Command Speed	>= 300.00 RPM		
					Pump Enable	= True		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Wastegate A Position Exceeded Learning Limit	P2B93	This DTC indicates a failure that the close position learning of the electronic waste gate 'A' was not successful. The learned raw close position was out of the boundaries. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	eWG raw position ***************************** OR ***************************** Never learned a valid Close Position and Engine speed	> 85.0 % ************************* ************************* = FALSE > 1000 rpm	Diagnostic enabled when electronic waste gate is present.	True	on event	Type A, 1 Trips
			eWG raw position and eWG Stable condition detected: Position deviation Stable Time	< 50.0 % < 1.00 % >0.10sec	Diagnostic enabled when electronic waste gate is present. ***************************** Coolant Temperature ***************************** No DTCs:	True ***************************** >=80.0 °C *****************************	on event	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Injection Pulse Performance	P2B95	Monitors injector pulses when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that missed a pulse relative to the total number of pulses when multi pulse is active.	Injector voltage feedback is not able to detect an opening magnitude on any pulse for any cylinder Or Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder	=< **P2B96 - Opening Magnitude Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) OBD Manufacturer Enable Counter To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure In addition, Multi Pulse Strategy Is Enabled and Active Per the following: Engine Speed Accel Position Engine Run Time	= True = True = 0 < 400.00 degC > -12.00degC <= 66.00 degC >= 72.00 KPa >= 450.00 RPM <= 2,800.00 RPM <= 35.00 Pct < 100 seconds	Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: 100ms Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature AND	>= 700.00 degC		
					Engine Run Time	>= 0.00 seconds		
					OR			
					Engine Run Time	> **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.		
					OR			
					Barometric Pressure	< 72.00 KPa		
					Multi Pulse Strategy will exit per the following:			
					Engine Speed OR	> 3,000.00 RPM		
					Accel Position	> 40.00 Pct		
					Engine Run Time	>= 100 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Mulit Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:			
					"Additional Multi Pulse Enabling Criteria":			
					Green Engine Enrichment	Not Enabled		
					Misfire Converter Protection strategy	Not being requested		
					Engine Metal Overtemp strategy	Not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Dynamic Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		
					Injector Flow Test	Not Active		
					General Enable			
					DTC's Not Set:	AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA AC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit TFTK0 FHPR_b_FRP_SnsrCkt_FA FHPR_b_FRP_SnsrCkt_TFTKO FHPR_b_PumpCkt_FA FHPR b PumpCkt TFTK0 TransmissionEngagedState_FA EngineTorqueEstInaccurate FuelPumpRlyCktFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injection Pulse Performance Global missing pulse diags	P2B96	Diagnostic to determine if any of the commanded injection pulses for any of the cylinders was not delivered due to the injector pintle/armature not moving (total engine based). The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude on any pulse for any cylinder Or Measured Voltage feedback converted to Injector Opening Magnitude on any pulse for any cylinder	=< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit** => **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2 Misisng Pulse Fail Limit** =< **P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2 Delta Misisng Pulse Fail Limit** (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below) Above Engine Temperature	= True = True >--30.000	100.00 Frequency: 100ms Continuous	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 Pump Stuck/ Stalled	P2BA2	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	>= 10.00 RPM	Diagnostic is Enabled 12V System Voltage PECR_MainCoolPmpSpdAct_Av PECR_MainCoolPmpSpdAct_Fol 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 >= 3.00 s = False 0.00 RPM to 4.00 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 Temperature Sensor 5 Circuit Intermittent/ Erratic	P2BB5	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr5 Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolantTempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolantTempSnsr Temperature Sensor 4: CeEECR_e_NollseAssgnmnt Temperature Sensor 5: CeEECR_e_NollseAssgnmnt		Diagnostic is Enabled No Active DTC's	 EECR_TS5_Erratic_TFTK0 EECR_TS5_CktHiLo_FA	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6 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 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 10.0 seconds -60.0 °C 150.0 °C 10.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 7.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 5.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Temperature Sensor 6 Circuit Low	P2BB8	Circuit Continuity This DTC detects a short to ground in the a temperature sensor signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr6 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NoUseAssg nmnt Temperature Sensor 5: CeEECR_e_NoUseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	< X Ohms X is equal to: Temp Sensor 1: 55 Ohms Temp Sensor 2: 55.0 Ohms Temp Sensor 3: 41.1 Ohms Temp Sensor 4: 55.0 Ohms Temp Sensor 5: 41.1 Ohms Temp Sensor 6: 55.0 Ohms Temp Sensor 7: 55.0 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 6 Circuit High	P2BB9	Circuit Continuity This DTC detects a short to high or open in a temperature signal circuit or the temperature sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60°C) This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: RadCoolantTempSnsr Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt Temperature Sensor 6: CeEECR_e_EngCoolant TempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolant TempSnsr6	> X Ohms X is equal to: Temp Sensor 1: 174,069 Ohms Temp Sensor 2: 174,069 Ohms Temp Sensor 3: 354,667 Ohms Temp Sensor 4: 174,069 Ohms Temp Sensor 5: 354,667 Ohms Temp Sensor 6: 174,069 Ohms Temp Sensor 7: 174,069 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 6 Circuit Intermittent/ Erratic	P2BBA	Circuit Erratic This DTC detects large step changes in a temperature signal circuit or the temperature sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	Temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. This program uses a highly confiurable sensor reading system. This DTC is associated with the temp sensor that is equal to: EngCoolantTempSnsr6 Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsrl Temperature Sensor 2: CeEECR_e_EngCoolant TempSnsr2 Temperature Sensor 3: CeEECR_e_RadCoolant TempSnsr Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg nmnt		Diagnostic is Enabled No Active DTC's	 EECR_TS6_Erratic_TFTK 0 EECR_TS6_CktHiLo_FA	5 seconds out of a 6 seconds window Continuously sampled	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 6: CeEECR_e_EngCoolantTempSnsr5 Temperature Sensor 7: CeEECR_e_EngCoolantTempSnsr6 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 6: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit	 10.0 seconds -60.0 °C 150.0 °C 10.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 5.0 seconds -60.0 °C 150.0 °C 7.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Temperature Sensor 7: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last temp reading was 90 °C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 °C and the high limit was calibrated to 200 °C the calculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****************************	 5.0 seconds -60.0 °C 150.0 °C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position SensorA Circuit Bank 1	P2C05	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor A 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position SensorA Range/ Performance Bank 1	P2C06	Intake Hall Sensor 1 position feedback not matching expected	DTC detects shift Pin Position Hall feedback failures If Hall Feedback signal seen but no shift command was sent to actuator. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00)	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00,	Diagnostic is Enabled System Voltage Engine Running No active PCODES	 > 11.00 Volts = TRUE CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO	4.00 samples out of 5.00 reading	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position SensorA Circuit Low Bank 1	P2C07	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor A solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position SensorA Circuit High Bank 1	P2C08	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position SensorA 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded off Ignition switch is in crank or run position	 > 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor B Circuit Bank 1	P2C09	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor B 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor B Range/ Performance Bank 1	P2C0A	Intake Hall Sensor 2 position feedback not matching expected	DTC detects shift Pin Position Hall feedback failures If Hall Feedback signal seen but no shift command was sent to actuator. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00)	 Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	Diagnostic is Enabled System Voltage Engine Running No active P codes	 > 11.00 Volts = TRUE CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO	4.00 samples out of 5.00 reading	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor B Circuit Low Bank 1	P2C0B	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor B solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor B Circuit High Bank 1	P2C0C	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor B 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded off Ignition switch is in crank or run position	 > 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor C Circuit Bank 1	P2C0D	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor C 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 K Ω impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor C Range/ Performance Bank 1	P2C0E	Intake Hall Sensor 3 position feedback not matching expected	DTC detects shift Pin Position Hall feedback If Hall Feedback signal seen but no shift command was sent to actuator. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00)	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	Diagnostic is Enabled System Voltage Engine Running No Active P codes	 > 11.00 Volts = TRUE CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO	4.00 samples out of 5.00 reading	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor C Circuit Low Bank 1	P2C0F	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor C solenoid 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 Ω impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor C Circuit High Bank 1	P2C10	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor C 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded off Ignition switch is in crank or run position	 > 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Actuator Position SensorA Circuit Bank 1	P2C12	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor A 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Actuator Position SensorA Range/ Performance Bank 1	P2C13	Exhaust Hall Sensor 1 position feedback not matching expected	DTC detects shift Pin Position Hall feedback If Hall Feedback signal seen but no shift command was sent to actuator. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00)	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	Diagnostic is Enabled System Voltage Engine Running No Active P Codes	 > 11.00 Volts = TRUE CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO	4.00 samples out of 5.00 reading	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Actuator Position SensorA Circuit Low Bank 1	P2C14	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor A solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	1 > 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Actuator Position SensorA Circuit High Bank 1	P2C15	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position SensorA 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded off Ignition switch is in crank or run position	 > 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Actuator Position Sensor B Circuit Bank 1	P2C16	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor B 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Actuator Position Sensor B Range/ Performance Bank 1	P2C17	Exhaust Hall Sensor 2 position feedback not matching expected	DTC detects shift Pin Position Hall feedback failures If Hall Feedback signal seen but no shift command was sent to actuator. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00)	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	Diagnostic is Enabled System Voltage Engine Running No Active P Codes	 > 11.00 Volts = TRUE CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO	4.00 samples out of 5.00 reading	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Actuator Position Sensor B Circuit Low Bank 1	P2C18	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor B solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Actuator Position Sensor B Circuit High Bank 1	P2C19	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator Position Sensor B 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded off Ignition switch is in crank or run position	 > 11.00 Volts	4.00 fail reports out of 5.00 samples	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 SIDI High Pressure Pump min/ max authority During Catalyst Warm Up	P2C1E	This DTC determines when the high pressure pump control has reached to its max or min authority during Cataylst Warm up	High Pressure Fuel Pump Delivery Angle OR High Pressure Fuel Pump Delivery Angle	>= 92° <= 0°	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -20.0 degC -12 <= Temp degC <= 132 = True	Windup High/ Low 10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance During Catalyst Warm Up	P2C1F	This DTC determines if the high pressure pump is not able to maintain target pressure Catalyst Warm Up. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	>= **P228C P2C1F-High Pressure Pump Control (HPC) fail threshold of pressure too low** Mpa (see supporting tables)	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable	True	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips
					Battery Voltage	>=11 Volts		
					Low Side Fuel Pressure	> 0.275 MPa		
					Catalyst Warm up enabled (See Definition in Supporting Material below)	= True		
					Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and	Enabled when a code clear is not active or not exiting device control Engine is not cranking		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active			
					Barometric Pressure Inlet Air Temp Fuel Temp	>= 70.0 KPA >=-20.0 degC -12<=Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
SIDI High Pressure Pump Performance During Catalyst Warm Up	P2C20	This DTC determines if the high pressure pump is delivering high pressure that desired pressure Catalyst Warm Up. The fault is set if the measured fuel rail pressure is higher than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	<= **P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high** Mpa (see supporting tables)	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not	True >=11 Volts >0.275 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -20.0 DegC -12 <= Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Oil Temperature Sensor A/B Correlation	P2C21	Determines if one of the redundant oil temperature sensors is biased or stuck in range. Three independent tests can be used.1) Cold Start Test Compares EOT to ECT and IAT at powerup after a long soak (Fast and regular tests). 2) Warm Up Test Compares EOT to a target EOT after a large enough accumulated airflow has occurred. 3) Continuous Test Compares Sensor A to Sensor B.	**Fast Cold Start Test** <u>To indicate an fast fail:</u> Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup IAT - Powerup ECT <u>To indicate a fast pass:</u> Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - Powerup IAT	EOT Temp Diff > **FastFailTempDiff** (See P0196 details on Supporting Tables Tab) AND < 16 degrees C < 16 degrees C AND < 16 degrees C	EOT Diagnostic main Status AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity No active DTC's	Enabled = True Enabled > 2,100 Seconds = True Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA	Cold Start Fast Test - one failure out of one sample - test performed once per second	Type B, 2 Trips
			Cold Start Test <u>Pass Condition 1:</u> Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - minIAT OR <u>Pass Condition 2:</u> Absolute value of Powerup EOT - Powerup ECT	<= 16 Deg C <= 16 Deg C OR > 16 Deg C	All three tests (Cold/ Warm/Continuous) EOT Diagnostic main enable AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity	Enabled = True Enabled > 2,100 Seconds = True	Cold Start Regular Test - one failure out of one sample - test performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND	AND				
			(IAT minimum observed with Block Heater	> -9 Deg C	Time above Minimum Vehicle Speed	> 9 MPH for > 400 seconds		
			or					
			(IAT minimum observed and	> -10 Deg C	Time less than Vehicle speed resets above timer	< 15.0 for > 20.0 seconds		
			Absolute value of power up IAT - min. observed IAT))	<= 5 Deg C	No active DTC's	Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuit FA		
			AND	AND				
			Absolute value of Powerup EOT - Powerup IAT	<= 16 Deg C				
			AND					
			Absolute value of Powerup EOT - minIAT	<= 16 Deg C				
			<u>Fail Condition:</u>					
			Absolute value of Powerup EOT - Powerup EOT	> 16 Deg C				
			AND	AND				
			(IAT minimum observed with Block Heater	> -9 Deg C				
			or					
			(IAT minimum observed and	> -10 Deg C				
			Absolute value of power up IAT - min. observed IAT))	<= 5 Deg C				
			AND	AND				
			(Absolute value of Powerup EOT - Powerup IAT	> 16 Deg C				
			or					
			Absolute value of Powerup EOT - minIAT)	> 16 Deg C				
			AND	AND				
			Absolute value of Powerup ECT - Powerup IAT	<= 16 Deg C				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			AND Absolute value of Powerup ECT - minIAT	AND <= 16 Deg C				
			Warmup Test <u>Warm Up Fail Condition:</u> EOT <u>Warm Up Test Pass Condition:</u> EOT	 < 70 Deg C => 70 Deg C	EOT Diagnostic main enable Engine Running Warm Up EOT Test Specific Conditions: Use Warm Up EOT Diagnostic Power up ECT Power up ECT Total accumulated engine airflow since engine start DISABLE CONDITIONS (for all three tests)No active DTC's	Enabled = True Disabled > 200 degrees C < 200 degrees C >= **P0196_TotalAccumulatedFlow** (See P0196 details on Supporting Tables Tab) Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA	Warm up Tests - one failure out of one sample - test performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Continuous Test Pass Condition: (Measured Oil Temperature A - Measured Oil Temperature B) OR Absolute value of (Measured Oil Temperature A - Measured Oil Temperature B) Fail Condition: (Measured Oil Temperature A - Measured Oil Temperature B) AND Absolute value of (Measured Oil Temperature A - Measured Oil Temperature B)	>= 0 and <= 15.8 OR >= 0 and <= 15.8 > 15.8 AND > 15.8	Redundant Sensor Enable EOT Diagnostic main Enable Engine Running Continuous EOT Test Specific Conditions: Power up ECT and ECT All of three criteria above AND EOT Model Oil Temperature reach Equilibrium OR Use quick transition to equilibrium state and ECT DISABLE CONDITIONS (for all three tests)No active DTC's	Enabled Enabled = True Enabled >= -9 and <= 105 Deg C >= 45 and <= 105 Deg C >= 70 Deg C Enabled and >= ECT from 5 sec previous Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA IAT_SensorCircuitFA EngOilModeledTempValid	Continuous Test 8 failures out of 10 samples performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Wastegate Position SensorA Circuit Performance	P2C9B	Detects a performance failure on the electronic wastegate acutuator system during engine cold start conditions The diagnose will fail if at least one of supervision fails. * Position deviation supervision * Actuator current supervision * Actuator Duty Cycle supervision In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Actuator is in Normal operation Abs(Position Error) for at least	 >10.0% >2.0 sec	Diagnostic enabled Engine not in crank mode Engine is in cold stard conditions Diagnostic system not disabled Device control Component test not active	True	29 failures out of 30 samples 100ms /sample	Type A, 1 Trips
			Abs(Actuator current) for at least	>1.0A > 1.0 sec	Diagnostic enabled Engine not in crank mode Engine is in cold stard conditions Diagnostic system not disabled Device control Component test not active	True	29 failures out of 30 samples 100ms /sample	
			Abs(Actuator DC) for at least	>40.0% DC > 1.0 sec	Diagnostic enabled Engine not in crank mode Engine is in cold stard conditions Diagnostic system not disabled Device control Component test not active	True	29 failures out of 30 samples 100ms /sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Engine Coolant Bypass Valve D Stuck Closed	P2E81	This diagnostic detects the performance of the Block Rotary Valve, bounded by the two mechanical endstops. It monitors the difference between raw position feedback and position request. If the enable criteria are met and the position difference exceeds the failed threshold and the raw position feedback reports a value that is below the calibrated threshold, the fail counter will increment. If the calibrated fail count threshold is met before the calibrated sample count, the diagnostic will report a Fail, and if not it will report a Pass. The diagnostic will continue to report as long as the enablement criteria are met.	Absolute value of the position difference between position request and position feedback AND Coolant Valve Position Feedback	> 5.00° < 50.00°	Diagnostic is Enabled Coolant system mode Catalyst Warmup Enabled The following shall be satisfied for [12V System Voltage VECR_BRV_PstnFdbk_Av VECR_BRV_PstnFdbk_Fol VECR_BRV_CktLo_FP, VECR_BRV_CktHi_FP VECR_BRV_CktLo_FA, VECR_BRV_CktHi_FA PowertrainRelayStateOn_FA, Powertrain Relay Feedback Circuit DTCs P0689, P0690 Powertrain Relay Commanded On Coolant Valve Position Command If Use Engine Block Coolant Temperature is TRUE, then the following shall be used [	 = Low Flow or Low Flow Autostop =TRUE >0.10 seconds > 11.00 V (hystersis disable < 10.00 V) = No Fault Pending = No Fault Active = No Fault Active = True = between -5.00 ° and 115.00° = 1.00	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 Block Coolant Enable Temperature]	>-34.00 °C (hystersis disable <= -35.00 °C)		
					Coolant Valve Calibration Run**	Has not been triggered for greater than 37.00 seconds		
					Change in Two Consecutive Coolant Valve Position Command]	> 5.00 ° for more than 3.00 seconds		
					** Calibration run is a set of pre-defined valve movements for calibrating the position sensor and learning the position of the endstops.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Cold Start Engine Coolant Pump Overspeed	P2E82	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.	Pump speed request - Pump speed feedback	< -200 RPM	Diagnostic is Enabled Coolant system mode Catalyst Warmup Enabled Difference in Pump Command Speed from previous data sample to present data sample ================= EECR_EngineInlet_FA Engine Inlet Coolant Temperature ================= Any of the following criteria is met: Criteria 1: Calibration to use fault pending is TRUE PECR_EMP_SpeedOORL_FP PECR_EMP_SpeedOORH_FP Criteria 2: Calibration to use fault pending is FALSE If either condition is achieved PECR_EMP_SpeedOORL_FA AND	 = Low Flow or Low Flow Autostop = TRUE <50.00 RPM for >= 3.00 s = Not Active >= -40.00 °C = 1.00(1 is TRUE) = Not Active = 1.00 (0 is FALSE)	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.
					PECR_EMP_SpeedOORL_TFTKO OR PECR_EMP_SpeedOORH_FA AND PECR_EMP_SpeedOORH_TFTKO	= Not Active = Not Active		

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	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	52 failed samples out of 60 samples in 6.25 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Pump Speed Out of Range Low	P3071	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.	Pump Feedback Speed	<= -10.00RPM	Diagnostic is Enabled All of the following criteria are met for 12V System Voltage PECR_MainCoolPmpSpdAct_Av PECR_MainCoolPmpSpdAct_Fol	 >= 3.00 s > 11.00 V (with hysteresis disable < 10.00 V) = 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.
Engine Coolant Pump Speed Out of Range High	P3072	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	>= 6,280.00 RPM	Diagnostic is Enabled All of the following criteria are met for 12V System Voltage PECR_MainCoolPmpSpdAct_Av PECR_MainCoolPmpSpdAct_Fol	 >= 3.00 s > 11.00 V (with hysteresis disable < 10.00 V) = 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.
Engine Coolant Pump Current Out of Range Low	P3073	This diagnostic detects if the actual motor current is out of range low. If the enable criteria are met and the actual current 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. There are two different failure criteria depending on the pump commanded state (ON, OFF), however one time window is used to mature the diagnostic, and is not independent for each commanded state.	Pump Motor AC Current	< 0.00A	Diagnostic is Enabled 12V System Voltage PECR_MainCoolPmpMtrACC_Av PECR_MainCoolPmpMtrACC_Fol	 > 11.00 V (with hysteresis disable < 10.00 V) = 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.
Engine Coolant Pump Current Out of Range High	P3074	This diagnostic detects if the actual motor current is out of range high. If the enable criteria are met and the actual current 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 Motor AC Current	>= 80.00 A	Diagnostic is Enabled 12 System Voltage PECR_MainCoolPmpMtrACC_Av PECR_MainCoolPmpMtrACC_Fol	 > 11.00 V (with hysteresis disable < 10.00 V) = 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.
Engine Coolant Pump Low Current Performance	P3075	The current performance diagnostic detects and reports failure of the pump or the cooling system flow. The diagnostic consists of an intrusive test performed each drive cycle if the necessary enable conditions are met and a passive test that runs continuously when the intrusive test is not executing. Only the intrusive test can report a diagnostic fail or pass result. Pump low current condition is when the actual electrical current is less than the expected electrical current for the reported pump speed. If the enable criteria are met, the intrusive test controls the pump to a calibratable speed for a calibratable time, during this time, if the actual current is less than the low current calibration failure threshold, the diagnostic reports a FAIL. If the actual current does not fall below the low current calibration failure threshold, the	Intrusive Test: Any of the following criteria is met Criteria 1: **P3075 3076 Pump** a) **Current Scaled** (A) b) EECR_EngineInlet FA is Not Active Criteria 2: a) Pump Motor AC Current (See supporting tables for the above threshold values) The intrusive test runs at least once every drive cycle, but may be enabled again if the passive test has determined a potential failure after the intrusive diagnostic has passed.	< **P3075 Pump Low Current Performance Failure Threshold** (A) (See supporting tables for the above threshold values)	Diagnostic is Enabled		4 seconds out of a 5 seconds window	Type B, 2 Trips
					12V System Voltage	>= 10.20 V		
					PECR_MainCoolPmpMtrACC_Av PECR_MainCoolPmpMtrACC_FoI PECR_MainCoolPmpSpdAct_Av PECR_MainCoolPmpSpdAct_FoFA PECR_MainCoolPmpSpdAct_FoI PECR_MainCoolPmpSpdAct_LcFA PECR_EMP_CurrOORL_FA PECR_EMP_CurrOORH_FA PECR_EMP_SpdBndl_FA PECR_EMP_CurrPerfLo_TFTKO PECR_EMP_CurrPerfHi_TFTKO VECR_BRV_Ckt_FA VECR_BRV_Performance_FA VECR_MRV_ActrFA EECR_EngineOutlet_FA	= Not Active		
					Pump Enable	= True		
					Engine Block Valve Coolant Flow in Range	20.00 to 100.00%		
					Coolant Flow Restriction Factor in Range	0.20 to 1.00		
					Pump Intrusive Test Timer	< 20.00 s		
					Pump Speed Feedback in			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		diagnostic reports a PASS.			Range	3,800.00 RPM to 4,200.00 RPM		
					All of the following criteria are met for	>= 2.00 s		
					a) Coolant Distribution Mode (Criteria is met when the array table for the given distribution mode is TRUE)	**P3075 3076 Pump Current Performance Coolant Distribution =Mode** (1 is TRUE)		
					b) Coolant System Mode (Criteria is met when the array table for the given distribution mode is TRUE)	**P3075 3076 Pump Current Performance Coolant System Mode =Select** (1 is TRUE)		
					Any of the following criteria is met for	>= 2.00 s		
					Criteria 1:			
					a) Passive Test Result	= Fail		
					b) Desired Air Per Cylinder	> 120.00 mg (with hysteresis disable < 100.00 mg)		
					Criteria 2:			
					a) Passive Test Result	= Not Fail		
					b) Desired Air Per Cylinder	> 120.00 mg (with hysteresis disable < 100.00 mg)		
					Any of the following criteria is met:			
					Criteria 1:			
					a)			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					PECR_EMP_CurrPerf Hi_TPTKO PECR_EMP_CurrPerf Lo_TPTKO b) Pump Intrusive Test Attempts Criteria 2: a) Passive Test Result b) Pump Passive Requests Any of the following criteria is met: a) Engine Outlet Coolant Temperature b) OBD Coolant Enable	= Not Active <= 3.00 Count = Fail <= 3.00 Count >= 50.00 °C = True		
			Passive Test: Pump Motor AC Current The passive test has fewer enable conditions than the intrusive, and is disabled while the intrusive test runs. The passive test monitors the reported current at any given pump speed and flow restriction. Flow restriction is calculated	<= **P3075 Pump Low Current Passive Test Fail Threshold** (A) (See supporting tables for the above threshold values)	Diagnostic is Enabled 12V System Voltage PECR_MainCoolPmpMtr ACC_Av PECR_MainCoolPmpMtr ACC_FoI PECR_MainCoolPmpSpd Act_Av PECR_MainCoolPmpSpd Act_FoFA PECR_MainCoolPmpSpd Act_FoI PECR_MainCoolPmpSpd Act_LcFA PECR_EMP_CurrOORL_FA PECR_EMP_CurrOORH_FA	 >= 10.20 V	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.
			based on the current system valve configuration and pump speed. If the passive test determines a potential fault, then the intrusive test is re-enabled. All of the intrusive enable conditions must still be met prior to executing the intrusive test and making a diagnostic pass/fail decision.		PECR_EMP_SpdBndl_FA PECR_EMP_CurrPerfLo_TFTKO PECR_EMP_CurrPerfHi_TFTKO VECR_BRV_Ckt_FA VECR_BRV_Performance_FA VECR_MRV_ActrFA EECR_EngineOutlet_FA Pump Enable Pump Intrusive Test Override Difference in Pump Command Speed from previous data sample to present data sample Pump Speed Feedback in Range Any of the following criteria is met: a) Engine Outlet Coolant Temperature b) OBD Coolant Enable	= Not Active = True = Not Active <50.00 RPM for >= 3.00 s 810.00 RPM to 6,180.00 RPM for >=2.00 s >=50.00 °C = True		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Coolant Pump High Current Performance	P3076	The current performance diagnostic detects and reports failure of the pump or the cooling system flow. The diagnostic consists of an intrusive test performed each drive cycle if the necessary enable conditions are met and a passive test that runs continuously when the intrusive test is not executing. Only the intrusive test can report a diagnostic fail or pass result. Pump high current condition is when the actual electrical current is greater than the expected electrical current for the reported pump speed. If the enable criteria are met, the intrusive test controls the pump to a calibratable speed for a calibratable time, during this time, if the actual current is greater than the high current calibration failure threshold, the diagnostic reports a FAIL. If the actual current does not exceed the high current calibration failure threshold, the	Intrusive Test Any of the following criteria is met Criteria 1: **P3075 3076 Pump** a) **Current Scaled** (A) b) EECR_EngineInlet F A is Not Active Criteria 2: a) Pump Motor AC Current (See supporting tables for the above threshold values) The intrusive test runs at least once every drive cycle, but may be enabled again if the passive test has determined a potential failure after the intrusive diagnostic has passed.	> **P3076 Pump High Current Performance Failure Threshold** (A) (See supporting tables for the above threshold values)	Diagnostic is Enabled 12V System Voltage PECR_MainCoolPmpMtrACC_Av PECR_MainCoolPmpMtrACC_FoI PECR_MainCoolPmpSpdAct_Av PECR_MainCoolPmpSpdAct_FoFA PECR_MainCoolPmpSpdAct_FoI PECR_MainCoolPmpSpdAct_LcFA PECR_EMP_CurrOORL_FA PECR_EMP_CurrOORH_FA PECR_EMP_SpdBndl_FA PECR_EMP_CurrPerfLo_TFTKO PECR_EMP_CurrPerfHi_TFTKO VECR_BRV_Ckt_FA VECR_BRV_Performance_FA VECR_MRV_ActrFA EECR_EngineOutlet_FA Pump Enable Engine Block Valve Coolant Flow in Range Coolant Flow Restriction Factor in Range Pump Intrusive Test Timer Pump Speed Feedback in	>= 10.20 V = Not Active = True 20.00 to 100.00% 0.20 to 1.00 < 20.00 s	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.
		diagnostic reports a PASS.			Range	3,800.00 RPM to 4,200.00 RPM		
					All of the following criteria are met for	>= 2.00 s		
					a) Coolant Distribution Mode (Criteria is met when the array table for the given distribution mode is TRUE)	**P3075 3076 Pump Current Performance Coolant Distribution =Mode** (1 is TRUE)		
					b) Coolant System Mode (Criteria is met when the array table for the given distribution mode is TRUE)	**P3075 3076 Pump Current Performance Coolant System Mode =Select** (1 is TRUE)		
					Any of the following criteria is met for	>= 2.00 s		
					Criteria 1: a) Passive Test Result	= Fail		
					b) Desired Air Per Cylinder	> 120.00 mg (with hysteresis disable < 100.00 mg)		
					Criteria 2: a) Passive Test Result	= Not Fail		
					b) Desired Air Per Cylinder	> 120.00 mg (with hysteresis disable < 100.00 mg)		
					Any of the following criteria is met:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Criteria 1: a) PECR_EMP_CurrPerfHi_TPTKO PECR_EMP_CurrPerfLo_TPTKO b) Pump Intrusive Test Attempts Criteria 2: a) Passive Test Result b) Pump Passive Requests Any of the following criteria is met: a) Engine Outlet Coolant Temperature b) OBD Coolant Enable	 = Not Active <= 3.00 Count = Fail <= 3.00 Count >= 50.00 °C = True		
			Passive Test: Pump Motor AC Current The passive test has fewer enable conditions than the intrusive, and is disabled while the intrusive test runs. The passive test monitors the reported current at any given pump speed	>= **P3076 Pump High Current Passive Test Fail Threshold** (A) (See supporting tables for the above threshold values)	Diagnostic is Enabled 12V System Voltage PECR_MainCoolPmpMtrACC_Av PECR_MainCoolPmpMtrACC_FoI PECR_MainCoolPmpSpdAct_Av PECR_MainCoolPmpSpdAct_FoFA PECR_MainCoolPmpSpdAct_FoI PECR_MainCoolPmpSpdAct_LcFA PECR_EMP_CurrOORL_FA	 >= 10.20 V	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.
			and flow restriction. Flow restriction is calculated based on the current system valve configuration and pump speed. If the passive test determines a potential fault, then the intrusive test is re-enabled. All of the intrusive enable conditions must still be met prior to executing the intrusive test and making a diagnostic pass/fail decision.		PECR_EMP_CurrOORH_FA PECR_EMP_SpdBndl_FA PECR_EMP_CurrPerfLo_TFTKO PECR_EMP_CurrPerfHi_TFTKO VECR_BRV_Ckt_FA VECR_BRV_Performance_FA VECR_MRV_ActrFA EECR_EngineOutlet_FA Pump Enable Pump Intrusive Test Override Difference in Pump Command Speed from previous data sample to present data sample Pump Speed Feedback in Range Any of the following criteria is met: a) Engine Outlet Coolant Temperature b) OBD Coolant Enable	= Not Active = True = Not Active <50.00 RPM for >= 3.00 s 810.00 RPM to 6,180.00 RPM for >=2.00 s >=50.00 °C = True		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 4 Control Circuit Open	P3080	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 4 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 K Ω impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 4 Control Circuit Low Voltage	P3081	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 4 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 4 Control Circuit High Voltage	P3082	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 4 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 4 Performance	P3083	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 4	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 4 Pin Stuck	P3084	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 4 fora pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00) If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00, but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 5 Control Circuit Open	P3085	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 5 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 5 Control Circuit Low Voltage	P3086	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 5 solenoid 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 Ω impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 5 Control Circuit High Voltage	P3087	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 5 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 5 Performance	P3088	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 5	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 5 Pin Stuck	P3089	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 5 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00) If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00, but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 6 Control Circuit Open	P308A	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 6 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 6 Control Circuit Low Voltage	P308B	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 6 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 6 Control Circuit High Voltage	P308C	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 6 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 6 Performance	P308D	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 6	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 6 Pin Stuck	P308E	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 6 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00) If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00, but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 7 Control Circuit Open	P308F	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 7 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 K Ω impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 7 Control Circuit Low Voltage	P3090	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 7 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 7 Control Circuit High Voltage	P3091	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 7 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 Ω impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 7 Performance	P3092	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 7	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 7 Pin Stuck	P3093	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 7 fora pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00) If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00, but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 8 Control Circuit Open	P3094	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 8 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 8 Control Circuit Low Voltage	P3095	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 8 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 8 Control Circuit High Voltage	P3096	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator 8 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 8 Performance	P3097	An unintended pin firing without controller command. Intake Camshaft Profile Actuator 8	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Intake Camshaft Profile Actuator 8 Pin Stuck	P3098	Monitors Sliding Cam Actuator Hall Sensor Feedback looking for an extended pin when it should have been returned and be reporting above the "RETRACTED" threshold. Monitors Intake Camshaft Profile Actuator 8 for a pin stuck out condition.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00) If EXTENDING and or EXTENDED have been obtained but RETRACTED is not obtained before the end of the engine cycle, Pin Stuck out is reported.	Feed back has reported below EXTENDING 55.00 and or below EXTENDED 45.00, but has not reported above RETRACTED by the end of the engine cycle the fault is reported 68.00 ,	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	1.00 failure report out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 4 Circuit Open	P3099	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 4 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 K Q impedance between signal and controller ground.	Diagnositc is Enabled System supply voltage Ignition switch is in crank or run position	 >11.00 Volts	4.00 Fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 4 Circuit Low Voltage	P309A	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 4 solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 4 Circuit High Voltage	P309B	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Actuator 4 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 Ω impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Exhaust Camshaft Profile Actuator 4 Performance	P309C	An unintended pin firing without controller command. Exhaust Camshaft Profile Actuator 4	Detected an Uninteded pin firing wlithout controller command.	System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) If actuator below 55.00 threshold without command	Diagnostic is Enabled system voltage engine running	 > 11.00 Volts = TRUE	4.00 incorrect positions out of 5.00 cylinder event position reads	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor D Circuit Bank 1	P30B0	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor D 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 K Ω impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 >11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor D Range/ Performance Bank 1	P30B1	Intake Hall Sensor 4 position feedback not matching expected	DTC detects shift Pin Position Hall feedback If Hall Feedback signal seen but no shift command was sent to actuator. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED(Pin returned to home position 68.00)	Pin Hall Feedback registers below 55.00 , then below 45.00 , then above 68.00 ,	Diagnostic is Enabled System Voltage Engine Running No Active P Codes	> 11.00 Volts = TRUE CrankSensor_FA CrankSensor_TFTKO CamLctnIntFA CamSnsrIntTFTKO CamLctnExhFA CamSnsrExhTFTKO	4.00 samples out of 5.00 reading	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor D Circuit Low Bank 1	P30B2	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor D solenoid 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 Q impedance between signal and controller ground	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position	 > 11.00 Volts	4.00 failures out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Actuator Position Sensor D Circuit High Bank 1	P30B3	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Actuator Position Sensor D 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 Q impedance between signal and controller power	Diagnostic is Enabled System supply Output driver is commanded off Ignition switch is in crank or run position	 > 11.00 Volts	4.00 fail reports out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Control Sleeve Position SensorA Circuit Bank 1	P30BE	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Position SensorA 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position No P Codes active	 >11.00 Volts CamSensorAnyLctnTFTK 0 CrankSensor_TFTKO	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Control Sleeve Position SensorA Range/ Performance Bank 1	P30BF	Monitors the output of the Sliding Cam Position Sensor for expected and in range signals. Intake sensor 1	First section of Diagnostic is the same as our CAM Sensor Performance Diagnostic Logic, it is using the same Sensors for Camshaft Profile Control Sleeve Position detection diagnostics. Hence they are diagnosed using the same methods. The diagnostic looks at the number of rising and falling edges seen in an engine cycle. 2 edges per engine cycle = PASS 0 edges per engine cycle with signal low = Short to Ground or Open OR 0 edges per engine cycle with signal High = Short to Power OR (2nd SECTION) Failed lift state change attempt signal sequence. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position	number of edges read this engine cycle <> 2.00 Buffer reading low signals Buffer reading High signals System feed back has reported less than all of the following: EXTENDING (below 55.00), EXTENDED (below 45.00) RETRACTED (above 68.00), and the barrel	Diagnostic is Enabled system voltage engine running No active Pcodes	 >11.00 Volts = TRUE CamSensorAnyLctnTFTKO CrankSensor_TFTKO	16.00 fails out of 20.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			68.00) We expect to see all 3 steps in sequence followed by the Position Sensor indicating a new lift state. Failure to receive any of the above indicate a failure.	position sensor identifying that the lift state has changed. Observation window. Not missing EXTENDED reading: 30.00 events Missing the EXTENDED reading: 20.00 events				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Control Sleeve Position Sensor B Circuit Bank 1	P30C2	Controller specific output driver circuit diagnoses the Intake Camshaft Profile Position Sensor B 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 K Ω impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position No P Codes active	 >11.00 Volts CamSensorAnyLctnTFTK0 CrankSensor_TFTKO	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Control Sleeve Position Sensor B Range/ Performance Bank 1	P30C3	Monitors the output of the Sliding Cam Position Sensor for expected and in range signals Intake 2	First section of Diagnostic is the same as our CAM Sensor Performance Diagnostic Logic, it is using the same Sensors for Camshaft Profile Control Sleeve Position detection diagnostics. Hence they are diagnosed using the same methods. The diagnostic looks at the number of rising and falling edges seen in an engine cycle. 2 edges per engine cycle = PASS 0 edges per engine cycle with signal low = Short to Ground or Open OR 0 edges per engine cycle with signal High = Short to Power OR (2nd SECTION) Failed lift state change attempt signal sequence. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00)	number of edges read this engine cycle <> 2.00 Buffer reading low signals Buffer reading High signals System feed back has reported less than all of the following: EXTENDING (below 55.00), EXTENDED (below 45.00) RETRACTED (above 68.00), and the barrel position sensor identifying that the lift state has changed.	Diagnostic is Enabled system voltage engine running No active Pcodes	 >11.00 Volts = TRUE CamSensorAnyLctnTFTKO CrankSensor_TFTKO	16.00 fails out of 20.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			We expect to see all 3 steps in sequence followed by the Position Sensor indicating a new lift state. Failure to receive any of the above indicate a failure.	Observation window. Not missing EXTENDED reading: 30.00 events Missing the EXTENDED reading: 20.00 events				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Control Sleeve Position SensorA Circuit Bank 1	P30C6	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Position SensorA 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run position No P Codes active	 >11.00 Volts CamSensorAnyLctnTFTK 0 CrankSensor_TFTKO	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Control Sleeve Position SensorA Range/ Performance Bank 1	P30C7	Monitors the output of the Sliding Cam Position Sensor for expected and in range signals Exhaust 1	First section of Diagnostic is the same as our CAM Sensor Performance Diagnostic Logic, it is using the same Sensors for Camshaft Profile Control Sleeve Position detection diagnostics. Hence they are diagnosed using the same methods. The diagnostic looks at the number of rising and falling edges seen in an engine cycle. 2 edges per engine cycle = PASS 0 edges per engine cycle with signal low = Short to Ground or Open OR 0 edges per engine cycle with signal High = Short to Power OR (2nd SECTION) Failed lift state change attempt signal sequence. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00)	number of edges read this engine cycle <> 2.00 Buffer reading low signals Buffer reading High signals System feed back has reported less than all of the following: EXTENDING (below 55.00), EXTENDED (below 45.00) RETRACTED (above 68.00), and the barrel position sensor identifying that the lift state has changed.	Diagnostic is Enabled system voltage engine running No active Pcodes	 >11.00 Volts = TRUE CamSensorAnyLctnTFTKO CrankSensor_TFTKO	16.00 fails out of 20.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			We expect to see all 3 steps in sequence followed by the Position Sensor indicating a new lift state. Failure to receive any of the above indicate a failure.	Observation window. Not missing EXTENDED reading: 30.00 events Missing the EXTENDED reading: 20.00 events				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
“B" Camshaft Profile Control Sleeve Position Sensor B Circuit Bank 1	P30CA	Controller specific output driver circuit diagnoses the Exhaust Camshaft Profile Position Sensor B 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 K Q impedance between signal and controller ground.	Diagnostic is Enabled System supply voltage Output driver is commanded on Ignition switch is in crank or run positionsystem voltage No P Codes active	 >11.00 Volts CamSensorAnyLctnTFTK 0 CrankSensor_TFTKO	4.00 fails out of 5.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Control Sleeve Position Sensor B Range/ Performance Bank 1	P30CB	Monitors the output of the Sliding Cam Position Sensor for expected and in range signals Exhaust 2	First section of Diagnostic is the same as our CAM Sensor Performance Diagnostic Logic, it is using the same Sensors for Camshaft Profile Control Sleeve Position detection diagnostics. Hence they are diagnosed using the same methods. The diagnostic looks at the number of rising and falling edges seen in an engine cycle. 2 edges per engine cycle = PASS 0 edges per engine cycle with signal low = Short to Ground or Open OR 0 edges per engine cycle with signal High = Short to Power OR (2nd SECTION) Failed lift state change attempt signal sequence. System measures 3 states for each shift, EXTENDING (Pin started firing 55.00), EXTENDED (Pin completely fired 45.00), RETRACTED (Pin returned to home position 68.00) We expect to see all 3	number of edges read this engine cycle <> 2.00 Buffer reading low signals Buffer reading High signals System feed back has reported less than all of the following: EXTENDING (below 55.00), EXTENDED (below 45.00) RETRACTED (above 68.00), and the barrel position sensor identifying that the lift state has changed. Observation window.	Diagnostic is Enabled system voltage engine running No active Pcodes	 >11.00 Volts = TRUE CamSensorAnyLctnTFTKO CrankSensor_TFTKO	16.00 fails out of 20.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			steps in sequence followed by the Position Sensor indicating a new lift state. Failure to receive any of the above indicate a failure.	Not missing EXTENDED reading: 30.00 events Missing the EXTENDED reading: 20.00 events				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Control Sleeve "A" Alignment	P30CE	The system monitors the Sliding Cam Control Sieve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.	The system monitors the Sliding Cam Control Sieve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change. Sieve Position Sensors identify a shift from High Lift, Low Lift or AFM to one of the other states with out the control system commanding the shift.	If current Barrel state (High Lift, Low Lift, AFM) is not equal to previous Barrel state (High Lift, Low Lift, AFM) and a state change was not commanded a failure is registered.	Diagnostic is Enabled system voltage engine run state No active Pcodes	 >11.00 Volts = TRUE CamSensorAnyLctnTFTK 0 CrankSensor_TFTKO	3.00 reading out of 200.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"A" Camshaft Profile Control Sleeve "B" Alignment	P30CF	The system monitors the Sliding Cam Control Sieve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.	The system monitors the Sliding Cam Control Sieve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change. Sieve Position Sensors identify a shift from High Lift, Low Lift or AFM to one of the other states with out the control system commanding the shift.	If current Barrel state (High Lift, Low Lift, AFM) is not equal to previous Barrel state (High Lift, Low Lift, AFM) and a state change was not commanded a failure is registered	Diagnostic is Enabled system voltage engine run state No active Pcodes	 >11.00 Volts = TRUE CamSensorAnyLctnTFTK 0 CrankSensor_TFTKO	3.00 reading out of 200.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Control Sleeve "A" Alignment	P30D0	The system monitors the Sliding Cam Control Sieve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.	The system monitors the Sliding Cam Control Sieve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change. Sieve Position Sensors identify a shift from High Lift, Low Lift or AFM to one of the other states with out the control system commanding the shift.	If current Barrel state (High Lift, Low Lift, AFM) is not equal to previous Barrel state (High Lift, Low Lift, AFM) and a state change was not commanded a failure is registered	Diagnostic is Enabled system voltage engine run state No active Pcodes	 >11.00 Volts = TRUE CamSensorAnyLctnTFTK0 CrankSensor_TFTKO	3.00 reading out of 200.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
"B" Camshaft Profile Control Sleeve "B" Alignment	P30D1	The system monitors the Sliding Cam Control Sieve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change.	The system monitors the Sliding Cam Control Sieve Position Sensors looking for an unintended shift. A recorded change in lift state without a control system command for a state change. Sieve Position Sensors identify a shift from High Lift, Low Lift or AFM to one of the other states with out the control system commanding the shift.	If current Barrel state (High Lift, Low Lift, AFM) is not equal to previous Barrel state (High Lift, Low Lift, AFM) and a state change was not commanded a failure is registered	Diagnostic is Enabled system voltage engine run state No P codes active	 >11.00 Volts = TRUE CamSensorAnyLctnTFTK0 CrankSensor_TFTKO	3.00 reading out of 200.00 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Injector Circuit Range/ Performance	P30D4	Diagnostic to determine if any of the voltage feedback measured from the analog to digital converter on any cylinder is rational (total engine based). The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit.	Injector voltage feedback is not able to detect an opening magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Measured Voltage feedback converted to Injector Opening Magnitude OR Injector voltage feedback is not able to detect a closing time OR Measured Voltage feedback converted to Injector closing time OR Measured Voltage	=< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude** (See supporting table) >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude** (See supporting table) =< **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time** (See supporting table) >=	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Valid (See Definition in Supporting Material below) Injection Pulse Width	= True >= **P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width**	2.50 Second Fail count out of 10.00 seconds Samples Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			feedback converted to Injector closing time	**P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time** (See supporting table)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 1	P30D6	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 3	P30D8	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 4	P30D9	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 5	P30DA	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 6	P30DB	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 1 6 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 7	P30DC	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 8	P30DD	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=6.41 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent 12.5 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 [DTCP135C]	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 [DTCP135C]	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.
P3186 (Internal Control Module Security Peripheral Performance)	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	3.00	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Performance - Under Pressure	P3187	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	> Threshold [Supporting Table] **P3187_Threshold**	a) Diagnostic is .. b) Timer - Engine Running Minimum c1) Fuel Flow Rate Valid c2) Ambient Air Pressure Value Defaulted c3) Fault bundle FDB_FuelPresSnsrCktFA c4) Reference Voltage Fault Status [DTC P0641] c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [DTC P20CD] c6) Fuel Pres Sensor Performance Fault Active [DTC P018B] c7) Use Calculated Flow Performance Fault Thresholds c8) Engine Speed Status Valid c9) Fault bundle FAB_FuelPmpCktFA c10) Fuel Control Enable Fault Active [DTC P12A6] c11) Fuel Pump Driver Module OverTemp Fault	a) Enabled b) >= 30.00 seconds c1)== TRUE c2) == False c3) == False c4) == False c5) == False c6) == False c7) == False c8] ==TRUE c9] == False c10) == False d 1) == False	1 sample/ 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Active [DTC P1255] c12) Fuel Pump Speed Fault Active [DTCP129F] c13) CAN Sensor Bus message $0C3 Comm Fault [DTCP165C] c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [DTC U18A7] c15) Sensor Configuration [is Wired To FTZM?] c16) Sensor Bus Relay On d) Emissions Fuel Level Low [Message $3FB] e) Fuel Control Enable f) Fuel Pump Control State g) Input circuit minimum voltage h) High Pres Fuel Pump Mode Management Active j) High Pres Fuel Pump Control Mode m I) Fuel Pmp Speed Command Alive Rollina	c12) == False c13) ––False c14] == False c15) == CeFDBR_e_WiredTo_FTZM c16) == TRUE d) == False e) == TRUE f) == normal g) >= 9.00 volts h) == False j) == Not Disabled Mode AND == Not ZeroFlow Mode m I) == False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Count and Checksum Error [CAN Bus C $0CE] [DTC P14CD] m2) CAN Sensor Bus message $0C3 Available m3) Fuel Pres Sensor Ref Voltage Status Message Counter Incorrect Alive Rolling Count and Checksum Error [CAN Bus C $0C3] [DTC U18A7] n) Timer - Diagnostic Enable	 m2) == TRUE m3) == False n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Fuel Pump Performance - Over Pressure	P3188	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	<= Threshold [Supporting Table] **P3188_Threshold**	a) Diagnostic is .. b1) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [Cmd1 DTC U131D] b2) Sensor Configuration b3) Fuel Pres Sensor Serial Comm Ready b4) Fuel Pres Sensor Serial Comm Fault Pending [DTC P14D5] b5) Sensed Fuel Control Enable Serial Comm Ready b6) Sensed Fuel Control Enable Serial Comm Fault Pending c1) Fuel Flow data Valid c2) Ambient Air Pressure Value Defaulted c3) Fuel Pres Sensor Type c4) Fault Bundle FDB_FuelPresSnsrCktFA c5) Reference Voltage	a) Enabled b1)== False b2) == CeFDBR_e_WiredTo_FTZM b3) == TRUE b4) == False b5) == TRUE b6) == False c1)== TRUE c2) == False c3) == CeFDBR_e_AbsolutePressure c4) == False c5) == False	1 sample/ 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Fault Status [DTC P0641]			
					c6) Fuel Pres Sensor Performance Fault Active [DTC P018B]	c6) == False		
					c7) Use Calculated Flow Performance Fault Thresholds	c7) == False		
					c8) Engine Speed Status Valid	c8] ==TRUE		
					c9) Fault bundle FAB_FuelPmpCktFA	c9] == False		
					c10) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255]	c10) == False		
					c11) Fuel Pump Speed Fault Active [DTCP129F]	d 1) == False		
					c12) Fuel Pump Duty Cycle Fault Active [DTC P2BB3]	c12) == False		
					c13) CAN Sensor Bus message $0C3 Comm Fault [DTCP165C]	c13) ––False		
					c14) Fuel Pres Sensor Serial Comm Fault Active [DTC P14D5]	c14) == False		
					c15) Sensor Bus Relay On	c15) == TRUE		
					d1) Timer -- Minimum Engine Running	d1)>= 30.00 seconds		
					d2) Diaanostic Data	d2) == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Integrity OK e) Fuel Control Enable f) Fuel Pump Control State g) Instantaneous Fuel Flow h) Fuel Control Enable Fault Active [DTC P12A6] j) Emissions Fuel Level Low [Message $3FB] k) High Pres Fuel Pump Mode Management Enabled l) High Pres Fuel Pump Control Mode m) Diagnostic Data OK n) Timer - Diagnostic Enable	 e) == TRUE f) == Normal AND == NOT Over Response Active g) >= 0.05 gms /sec h) == False j) == False k) == False l) == NOT Disabled Mode AND NOT Over Response Active Mode m) == TRUE n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Stop/Start System Performance	P31C3	This diagnostic indicates that an autostart attempt has failed and the retry strategy has not been successful in re-starting the engine.	A successful Auto Start has occurred using the primary auto start actuator.	Engine Start Stop State = ENGINE RUNNING	Engine Start Stop State Previous During last transition of Engine Start Stop State from ENGINE OFF to ENGINE STARTING: Propulsion System Active AND Remedial Action Start Request Actuator Low Voltage	!= ENGINE RUNNING = TRUE = FALSE	Pass condition met for 12.5 ms (1 sample)	Type A, 1 Trips
			After an Auto Stop, the engine was not successfully restarted and the retry strategy was not available or was not successful in restarting the engine. Note: When attempting to restart the engine, only 1 start retry is allowed per available actuator for each Auto Start event. The number of total retries (all available actuators) is calibratible and limited each key cycle to 255.00 retry attempt(s). Note: Low Fuel Condition is always determined in the ECM.	Engine Start Fail = TRUE	P31C2 Low Fuel Condition Engine Positioning Fault (Cam or Crank) Propulsion Allowed	= NOT Fault Active = FALSE (% Total Fuel Level < 10.00% for > 30.00 sec) = FALSE = TRUE	Fail 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.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds	>= 10.00 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 >8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	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.
					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.
Control Module Communication Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures equals or exceeds	>= 10.00 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 >8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	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.
					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.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures equals or exceeds	>= 10.00 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 >8.41 Volts >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	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.
					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 $054:	>10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, 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.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With SADS	U0139	This DTC monitors for a loss of communication with the SADS.	Message is not received from controller for Message $364:	>325.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for Message $03E: Message $27A: Message $2C1: Message $2D8: Message $2D9: Message $36C: Message $36E: Message $3A4: Message $3BC: Message $479: Message $4E9: Message $512: Message $524:	>425.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >325.00 milliseconds >325.00 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: LI0073 not active If message is on Bus B: LI0074 not active If message is on Bus S: LI0076 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 $580: Message $581: Message $583: Message $592: Message $5A2: Message $5B8: Message $5C6: Message $5E2: Message $711:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

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

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 $039: Message $0B9: Message $528: Message $52A:	>10,000.00 milliseconds >9,800.00 milliseconds >450.00 milliseconds >450.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, 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.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Active Grill Air Shutter Module A	U0284	This DTC monitors for a loss of communication on the LIN bus 1 with Shutter Module A.	Message is not received from controller for ACM1_Rsp	>=1,250.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage	 Disabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts	LIN bus communication executes in 500ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	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 EVAP Purge Pump	U02BB	This DTC monitors for a loss of communication on the LIN bus with the EVAP Purge Pump	Message is not received from controller for EVAPP_Rsp_01_C05	>= 250.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Run/Crank ignition voltage If power mode = Accessory:	 Enabled Enabled Disabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	LIN bus communication executes in 500ms loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Transmissio n Control Module	U0402	This DTC monitors for an error in communication with the Transmission Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			TGI2P_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		
			TrnsGnrInfo2_Prtctd:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			SD48P_ARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			SrlDat48_Prtctd:	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			TEGP_ARC:	8.00 fail counts out of 18.00 sample counts				
			TrnsEstGr_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			SD30P.ARC:	8.00 fail counts out of 18.00 sample counts				
			SrlDat30_Prtctd:	8.00 fail counts out of 18.00 sample counts				
			TGI5P_ARC:	8.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				18.00 sample counts				
			TransGenlnfo5_Prtctd:	8.00 fail counts out of 18.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From Gear Shift Control Module A	U0404	This DTC monitors for an error in communication with the Gear Shift Control Module A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			LS1ISP_ARC:	4.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			LnrSnsrIInSec_Prtctd:	4.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
			DISSP.ARC:	4.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			DscrInSnsrSec_Prtctd:	4.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			DISP_ARC:	8.00 fail counts out of 18.00 sample counts				
			DISP_CS:	8.00 fail counts out of 18.00 sample counts				
			LSIP_ARC:	8.00 fail counts out of 18.00 sample counts				
			LSIP_CS:	8.00 fail counts out of 18.00 sample counts				
			EALUCSP.ARC:	4.00 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				
			ExtrnALUChkSec_Prtctd:	4.00 fail counts out of 10.00 sample counts				
			LS2I8P_ARC:	4.00 fail counts out of 10.00 sample counts				
			LnrSnsr2lnSec_Prtctd:	4.00 fail counts out of 10.00 sample counts				
			ESM-ARC:	8.00 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 Four-Wheel Drive Clutch Control Module	U0414	This DTC monitors for an error in communication with the Four-Wheel Drive Clutch Control Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			SAP_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		
			SecAxl_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 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 (CSUM) of the following signals received over serial data is incorrect for: SD16P_ARC: SrlDat16_Prtctd: BSIS2P_ARC: BrkSysInfoSts2_Prtctd: SWIP_ARC: StrgWhlInfo_Prtctd: WRDSP_ARC: EBCMGnrlInfo2_Prtctd: SD15P_ARC:	8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	>= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				10.00 sample counts				
			SrlDat15_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			BSIR3P_ARC:	3.00 fail counts out of 10.00 sample counts				
			BrkSysInfoReqs3_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			SD14P_ARC:	3.00 fail counts out of 10.00 sample counts				
			SrlDat14_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 (CSUM) of the following signals received over serial data is incorrect for: SWIP_ARC: StrgWhlInfo_Prtctd:	 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type 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.
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 (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			BGI3P_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		
			BdyGenlnfo3_Prtctd:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			SD2P_ARC:	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			SrlDat2_Prtctd:	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			SD9_ARC:	3.00 fail counts out of 10.00 sample counts				
			SD9_CS:	3.00 fail counts out of 10.00 sample counts				
			SD3_ARC:	3.00 fail counts out of 10.00 sample counts				
			SrlDat3_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			SPMP_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				
			SysPwrMode_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			IBSBatVlt_ARC:	3.00 fail counts out of 10.00 sample counts				
			IBSBatVlt_CS:	3.00 fail counts out of 10.00 sample counts				
			SD145_ARC:	3.00 fail counts out of 10.00 sample counts				
			SD145_CS:	3.00 fail counts out of 10.00 sample counts				
			VehOdoDispVal_Prtctd:	3.00 fail counts out of 10.00 sample counts				
			SD8_ARC:	3.00 fail counts out of 10.00 sample counts				
			SD8_CS:	3.00 fail counts out of 10.00 sample counts				
			CCHI_ARC:	3.00 fail counts out of 10.00 sample counts				
			CCHI_CS:	3.00 fail counts out of 10.00 sample counts				

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

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 (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			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			
			SrlDat90_Prtctd:	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
					Controller type: 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 (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type C, 1 Trip No MIL Emissions Neutral
			SD47P_ARC:	4.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
			SrlDat47_Prtctd:	4.00 fail counts out of 10.00 sample counts	Accessory mode to off mode transition not pending			
			PCIP_ARC:	3.00 fail counts out of 10.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			PstClsnInfo_Prtctd:	3.00 fail counts out of 10.00 sample counts	Controller type: OBD Controller			
			ORIP-ARC:	3.00 fail counts out of 10.00 sample counts				
			OccptRstrntInfo_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 Active Grill Air Shutter Module A	U0585	This DTC monitors for an error in communication with the Active Grill Air Shutter Module A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: ACMIJnitStatARC:	 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From DC/DC Converter Control Module A	U0599	This DTC monitors for an error in communication with the DC/DC Converter Control Module A.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			DCCnvActrVltADCValARC:	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		
			DCCnvActrVltADCValPVal:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			DCCCnvCrnkCtlTrmStARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			DCCCnvCrnkCtlTrmStPVal:	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Throttle Position Sensor 1	U0606	Detects a continuous or intermittent short low or short high or open fault in the TPS SENT Communication Circuit 1 by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below or above state threshold as defined by SAE J2716 SENT Protocol. Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is below a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold. This diagnostic only runs when battery voltage is high enough.	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol OR Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol OR Message Pulse < Message Pulse > OR Message Age Limit >= OR Signal CRC fails	0.5 V OR 4.1 V OR 0.125977 ms 0.209991 ms OR 3.125 ms	Run/Crank voltage	> 6.41 Volts	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Throttle Position Sensor 2	U0607	Detects a continuous or intermittent short low or short high or open fault in the TPS SENT Communication Circuit 2 by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below or above state threshold as defined by SAE J2716 SENT Protocol. Detects a message fault in the TPS SENT Communication Circuit by monitoring the message pulse time and failing the diagnostic when the time for the pulse is below a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold. This diagnostic only runs when battery voltage is high enough.	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol OR Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol OR Message Pulse < Message Pulse > OR Message Age Limit >= OR Signal CRC fails	0.5 V OR 4.1 V OR 0.125977 ms 0.209991 ms OR 3.125 ms	Run/Crank voltage	> 6.41 Volts	79/159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Mass or Volume Air Flow Sensor A	U060F	This DTC monitors for a loss of communication on the LIN bus 2 with Mass or Volume Air Flow Sensor A.	Message is not received from controller for		General Enable Criteria:		LIN bus communication executes in 500ms loop	Type A, 1 Trips
					Diagnostic is enabled	Disabled		
			MAF1_Press_Rsp	>=62.50 milliseconds				
					LIN channel is enabled	Enabled		
			MAF1_TmpHum_Rsp	>= 250.00 milliseconds				
					LIN module is initialized			
					Slave is calibrated as present			
					All below criteria have been met for	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank: Power Mode is run			
					Run/Crank ignition voltage	>=11.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or	Disabled		

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 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 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 Engine Coolant Bypass Valve D	U0618	This DTC monitors for a loss of communication on the LIN bus with Engine Coolant Bypass Valve D	Message is not received from controller for BRV_Rsp	>= 250.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage	 Enabled Enabled Disabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	 Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Fuel Rail Pressure Sensor Bank 1	U0625	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating low.	The number pulses on the SENT signal line SENT Signal Line State	<= 40 = Low	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per 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.
Cooling Fan 1 LIN Communication Failure	U0632	This DTC monitors for a loss of communication on the LIN bus 1 with Cooling Fan 1.	Message is not received from controller for CFM1_RSP	>=2,500.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Engine is running Or Engine cooling fan operation is enabled via received CAN signal and propulsion system is active for All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage	Disabled Enabled >=1.00 milliseconds >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Loss of communication with wastegate position sensor “A”	U0644	Detects a continuous communication fault on the eWG "A" SENT interface. The diagnostic monitors the SENT message in respect to message pulses and timing validity. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	SENT Mesage Faults SENT Mesage age	> 0 ent >3.13 ms	Diagnostic enabled and Sent Interface used **************************** Powertrain relay voltage **************************** Engine does not crank Diagnostic system not disabled	True True **************************** >=11.0 Volts ****************************	10 failures out of 12 samples 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.
Lost Communication with Fuel Temperature SensorA	U0670	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high.	The number pulses on the SENT signal line SENT Signal Line State	<= 40 = High	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per 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.
Lost Communication with Fuel Temperature Sensor B	U0671	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high.	The number pulses on the SENT signal line SENT Signal Line State	<= 40 = High	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per 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.
Lost Communication with Engine Coolant Pump	U0672	This DTC monitors for a loss of communication on the LIN bus with the Engine Coolant Pump	Message is not received from controller for MWP_Rsp_0F_C05	>= 250.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present Actuator relay is powered Or Powertrain Relay is on and powertrain relay state feedback is enabled All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage If power mode =	 Enabled Disabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts	LIN bus communication executes in 500ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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	 Disabled >=11.00 Volts		

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.
Fuel Tank Zone Module Configuratio n Error	U101A	FTZM Pump Control Configuration Management provides a method for a Diagnostic and Emissions-Critical Electronic Control Unit (DEC ECU) to communicate configuration information to an OBD Smart Device (SD); in this case the FTZM. The FTZM contains pre-loaded sets of calibrations, each of which specifies proper tuning values for electronic commutation of corresponding fuel pump motor variants including a default value that denotes a non-operational [factory default] pump variant. This configuration management feature provides a method to reduce the number of FTZM end-item part numbers. The Configuration Error Diagnostic runs every 100ms to verify that a calibration index value is present that is not the factory default value. When the diagnostic identifies that the default index value is loaded, the	FTZM Fuel Pump Configuration Calibration Index Value	= Factory Default Index Value OR = Not Configured Index Value [device failed to accept calibration value on 1st wake-up]	a] Diagnostic is .. b] Device feedback Faulted; c] Diagnostic system disabled; d] CAN serial data message $3C8 received	a] Enabled b] <> True; c] <>True; d] =TRUE	6.00 failures of 8.00 samples ; 100 millisec/ sample	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Fuel Rail Pressure Sensor Bankl Sensor 2	U101B	This DTC determines if the SENT signal shorted low, this is determined by monitoring the number pulses on the SENT signal line received at the ECU and the SENT Signal Line State always indicating high.	The number pulses on the SENT signal line SENT Signal Line State	<= 40 = High	SENT Sensor Communication Circuit Diagnostic Enabled SENT power up delay	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control	400 failures out of 500 samples 6.25 ms per 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.
Invalid Data Received from Cooling Fan Motor 1	U1314	This DTC monitors for an error in communication with the Cooling Fan Motor 1.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: PrplCoolFn1_ARC:	 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Mass Air Flow Sensor 1	U1319	This DTC monitors for an error in communication with the Mass Air Flow Sensor 1.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: PAMITempHmdtyARC: PAMIPresARC:	 3.00 fail counts out of 10.00 sample counts 8.00 fail counts out of 18.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Main Water Pump Motor	U131B	This DTC monitors for an error in communication with the Main Water Pump Motor.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: MainCoolPmpARC:	 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Fuel Tank Zone Module	U131D	This DTC monitors for an error in communication with the Fuel Tank Zone Module.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type A, 1 Trips
			FTZMInfoIARC:	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		
			FTZMInfoIChksm:	8.00 fail counts out of 18.00 sample counts	Accessory mode to off mode transition not pending			
			FTZMInfo11ARC:	8.00 fail counts out of 18.00 sample counts	If controller is a non-OBD controller then battery voltage	<= 18.00 volts		
			FTZMInfo11Chksm:	8.00 fail counts out of 18.00 sample counts	Controller type: OBD Controller			
			FTZMInfo8ARC:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo8Chksm:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo2ARC:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo2Chksm:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo12ARC:	8.00 fail counts out of				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				18.00 sample counts				
			FTZMInfo12Chksm:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo14ARC:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo14Chksm:	8.00 fail counts out of 18.00 sample counts				
			FTZMInfo3ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo3Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo4ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo4Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo5ARC:	4.00 fail counts out of 10.00 sample counts				
			FTZMInfo5Chksm:	4.00 fail counts out of 10.00 sample counts				
			FTZMInfo16ARC:	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.
			FTZMInfo16Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo6ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo6Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo7ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo7Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo9ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo9Chksm:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo13ARC:	3.00 fail counts out of 10.00 sample counts				
			FTZMInfo13Chksm:	3.00 fail counts out of 10.00 sample counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 1	U1345	This DTC monitors for a LIN bus off condition on LIN Bus 1.	Loss of Communication Method: The total number of diagnostic enabled slave nodes on LIN Bus 1 Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	 = Total number of slave nodes on LIN Bus 1 that have reported lost communications DTCs >= 10.00 counts	Loss of Communication Method: Diagnostic is enabled LIN channel is enabled LIN module is initialized All below criteria have been met for: LIN channel is requesting full communications Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics	 Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	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.
					are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage LIN channel Wakeup Method: Diagnostic is enabled LIN channel is enabled LIN channel is requesting full communications LIN module is initialized The following criteria have been enabled for: Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage	>=11.00 Volts Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 2	U1346	This DTC monitors for a LIN bus off condition on LIN Bus 2.	Loss of Communication Method:		Loss of Communication Method:		Dependent on bus loading.	Type A, 1 Trips
			The total number of diagnostic enabled slave nodes on LIN Bus 2	= Total number of slave nodes on LIN Bus 2 that have reported lost communications DTCs	Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN module is initialized			
			Or		All below criteria have been met for	>= 5,000.00 milliseconds		
			LIN channel Wakeup Method:		LIN channel is requesting full communications			
					Accessory mode to off mode not pending			
			LIN channel wakeup repetition counter	>=10.00 counts	Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			
					Run/Crank ignition voltage	>=11.00 Volts		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled	Disabled		

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 LIN channel Wakeup Method: Diagnostic is enabled LIN channel is enabled LIN channel is requesting full communications LIN module is initialized The following criteria have been enabled for: Accessory mode to off mode not pending Battery voltage	>=11.00 Volts Enabled Enabled >= 5,000.00 milliseconds >11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Engine Control Module LIN Bus 4	U1348	This DTC monitors for a LIN bus 4 off condition.	Loss of Communication Method:		Loss of Communication Method:		Dependent on bus loading.	Type A, 1 Trips
			The total number of diagnostic enabled slave nodes on LIN Bus 4	= Total number of slave nodes on LIN Bus 4 that have reported lost communications DTCs	Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN module is initialized			
			Or		The following criteria have been enabled for:	>= 5,000.00 milliseconds		
			LIN channel Wakeup Method:		LIN channel is requesting full communications			
			LIN channel wakeup repetition counter	>= 10.00 counts	Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			
					Run/Crank ignition voltage	>=11.00 Volts		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Disabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Controller shutdown not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN channel is requesting full communications			
					LIN module is initialized			
					The following criteria have been enabled for:	>= 5,000.00 milliseconds		
					Accessory mode to off mode not pending			
					Battery voltage	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from Block Coolant Valve Actuator	U1379	This DTC monitors for an error in communication with the Block Coolant Valve Actuator.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for: BRV_ARC:	 3.00 fail counts out of 10.00 sample counts	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	 >= 5,000.00 milliseconds >= 11.00 volts <= 18.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received from EVAP Purge Pump	U137A	This DTC monitors for an error in communication with the EVAP Purge Pump.	The signal value of the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) of the following signals received over serial data is incorrect for:		Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSUM) is available on the bus.		Executes in 12.5ms loop.	Type B, 2 Trips
			EVAPPurgPmpARC:	3.00 fail counts out of 10.00 sample counts	All the following conditions are met for:	>= 5,000.00 milliseconds		
					Battery voltage	>= 11.00 volts		
					Accessory mode to off mode transition not pending			
					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.
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.
Lost Communication with Transmission Control Module on Engine Control Module LIN Bus 1	U1600	This DTC monitors for a loss of communication on the LIN bus 1 with Transmission Control Module on Engine Control Module	Message is not received from controller for TCM_RSP	>= 125.00 milliseconds	General Enable Criteria: Diagnostic is enabled LIN channel is enabled LIN module is initialized Slave is calibrated as present All below criteria have been met for Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller	 Disabled Enabled >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts >=11.00 Volts Disabled	LIN bus communication executes in 500ms loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With Gateway A on CAN 2	U1608	This DTC monitors for a loss of communication with the Gateway A on CAN 2.	Message is not received from controller for Message $3A2: Message $3B0: Message $3BF: Message $3C2: Message $3C3: Message $3C4: Message $4DC: Message $500: Message $57F: Message $590: Message $5A1: Message $5AA: Message $5F9:	>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	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.
				>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Central Gateway Module on CAN Bus 3	U1609	This DTC monitors for a loss of communication with the Central Gateway Module on CAN Bus 3.	Message is not received from controller for Message $370: Message $3C2: Message $58C:	>325.00 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 calibratable low voltage disable mode is not Never Disabled			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:	Disabled		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Park Assist Module on CAN2	U160C	This DTC monitors for a loss of communication with the Park Assist Module on CAN2.	Message is not received from controller for Message $20D:	>10,000.00 milliseconds	General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type C, 1 Trip No MIL Emissions Neutral
					All below criteria have been met for	>= 5,000.00 milliseconds		
					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	>11.00 Volts		
					Conroller is an OBD controller Or Battery Voltage	<=18.00 Volts		
					Controller type: OBD Controller			
					If power mode = Run/ Crank:			
					Power Mode is run			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with 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 $03B: Message $042: Message $270: Message $27B: Message $369: Message $3AA: Message $3AB: Message $4F1: Message $51C: Message $5C9: Message $5CA:	>425.00 milliseconds >10,000.00 milliseconds >200.00 milliseconds >10,000.00 milliseconds >325.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Electronic Brake Control Module on CAN Bus 3	U1639	This DTC monitors for a loss of communication with the Electronic Brake Control Module on CAN Bus 3.	Message is not received from controller for Message $362:	>325.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	 >= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type 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			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If Secure: Starter motor engaged for	> 15,000.00 milliseconds		
					Or Run/Crank ignition voltage	> 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:	Disabled		
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Shifter Interface Board/ETRS Shifter Module on CAN Bus 1	U163C	This DTC monitors for a loss of communication with the Shifter Interface Board/ ETRS Shifter Module on CAN Bus 1.	Message is not received from controller for Message $0BC: Message $0BD: Message $20B: Message $20C:	>625.00 milliseconds >625.00 milliseconds >625.00 milliseconds >625.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled			
					IfOBDII: Run/Crank ignition voltage	>=11.00 Volts		
						> 15,000.00 milliseconds		
					If Secure: Starter motor engaged for	> 8.41 Volts		
					Or Run/Crank ignition voltage	>=6.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage			
						Disabled		
					If power mode = Accessory:			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller			
					Controller shutdown is not impending			
						>=11.00 Volts		
					Power Mode is not run/ crank			
					Battery voltage			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with External Object Calculating Module/ EOCM_HCP1/EOCM3/ ACP2_MCU on CAN Bus 3	U163D	This DTC monitors for a loss of communication with the External Object Calculating Module/ EOCM_HCP1/EOCM3/ ACP2_MCU on CAN Bus 3.	Message is not received from controller for Message $210:	>10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, 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.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Transmission Control Module on CAN Bus 2	U1643	This DTC monitors for a loss of communication with the Transmission Control Module on CAN Bus 2.	Message is not received from controller for Message $02D: Message $02E: Message $032: Message $034: Message $048: Message $06F: Message $0C4: Message $2CF: Message $363: Message $3A9: Message $4E8: Message $4EA: Message $5D3:	>418.75 milliseconds >418.75 milliseconds >418.75 milliseconds >10,000.00 milliseconds >418.75 milliseconds >10,000.00 milliseconds > 9,887.50 milliseconds >10,000.00 milliseconds >387.50 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.
				milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with Fuel Pump Driver Control Module	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module.	Message is not received from controller for Message $0C3: Message $0C4: Message $0CB: Message $0CC: Message $1E6: Message $2C1: Message $2D7: Message $2D9: Message $3C8: Message $3EB: Message $3EC: Message $3EE:	>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	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.
				>10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Sensor CAN Bus	U18C6	Detects that CAN serial data communication has been lost with the ECM.	Powertrain Sensor Bus Message $1E2 OR $1E8	Undetected	Ignition Run/Crank Voltage Ignition	11V < R C Volt < 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.
Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	U18D2	This DTC monitors for a loss of communication with the Transmission Range Selector Control Module on Powertrain Sensor CAN Bus.	Message is not received from controller for Message $1E4: Message $1EC: Message $2F3: Message $4C4:	 >687.50 milliseconds >687.50 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 calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication with DC to DC Converter on Powertrain Sensor Bus	U18E2	This DTC monitors for a loss of communication with the DC to DC Converter on Powertrain Sensor Bus.	Message is not received from controller for Message $0A8: Message $1C9:	>10,000.00 milliseconds >10,000.00 milliseconds	General Enable Criteria: All below criteria have been met for If message is on Bus A: U0073 not active If message is on Bus B: U0074 not active If message is on Bus S: U0076 not active CAN channel is requesting full communications Normal CAN transmission on Bus is enabled If bus type is Sensor Bus, sensor bus relay is on Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run	>= 5,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					If calibratable low voltage disable mode is not Never Disabled IfOBDII: 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 > 8.41 Volts >=6.41 Volts Disabled >=11.00 Volts		

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

Key Table Not Provisioned / Authoritative Counter At Maximum	U1960	This DTC indicates that the ECU security peripheral key slots are not provisioned OR ECU message authenticatioon Authoritative Counters are at MAX value	During controller initialization:
			
			IF (Any Security Peripheral Key Slot reports as Empty)
			-OR-
			(Any Authoritative Counter is at MAX value)
			
			During controller operation:
			
			IF (A Security Peripheral Key Slot reports as Empty)
			-OR-
			(An Authoritative Counter is at MAX value)
					Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1961 (Security Peripheral Performance)	U1961	This DTC indicates that the ECU security peripheral has reported that it has failed.	The ECU security peripheral reports that the security peripheral hardware has failed.		Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
U1962 (Unable to Authenticate Serial Data Message)	U1962	This DTC indicates that serial data message authentication on any key slot has failed a configurable number of times this key cycle.	Message authentication on a single key slot has failed a configurable number of times.	KeSSAR_Cnt_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.
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.
Security Peripheral Performance – Performance or Incorrect Operation	U1971	Detects error in MAC due to key provisioning	The security peripheral is considered to have failed only if it generates any of the following SECP Error Codes: ERC_SEQUENCE_ERROR ERC_MEMORY_FAILURE ERC_GENERAL_FAILURE				Monitored continuously while CAN frames are being transmitted and received.	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.
Vehicle Identification Number of First Vehicle Not Programmed	U1978	This DTC checks that the VIN of the first vehicle is correctly written	At least one of the programmed VIN of the first vehicle digits	Not a valid ASCII value	Calibration enable	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Shifter Interface Board Lost Communication with Body Control Module	U2215	Detects loss of communication from the BCM on CAN2 (PDll 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 (PDll 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.
Shifter Interface Board Lost Communication with Central Gateway Module - CAN1	U2421	Detects that CAN serial data communication has been lost with the CGM on CAN 1.	CAN frames originating from the CGM not received on CAN1.	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.
Odometer Vehicle Identification Number Not Programmed	U2A90	This DTC checks that the odometer VIN is correctly written	At least one of the programmed odometer VIN digits	Not a valid ASCII value	Calibration enable	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Odometer Vehicle Identification Number Invalid Configuratio n	U2A91	This DTC checks that the odometer VIN matches the ECU VIN	At least one of the programmed odometer VIN digits	Does not match the ECU VIN digits.	Calibration enable	= 1	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	Diagnostcis 1.00 Battey Present = TRUE RunCrank Active = TRUE Starter Motor Engaged = FALSE	50.00 failures out of 63.00	Type C, 1 Trip No MIL Emissions Neutral

Initial Supporting table - Maximum number of iterations allowed for torque solver

Description: Maximum number of iterations allowed for torque solver versus controller identifier name

Value Units: Number of iterations allowed
X Unit: Controller identifier enumeration name.
Y Units: Number of iterations allowed, integer values.

Maximum number of iterations allowed for torque solver - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	30	30	30	30	30	15	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Maximum number of iterations allowed for torque solver - Part 2

y/x	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	
1	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	

Initial Supporting table - P0128 Maximum Acculated Energy - Primary

Description: KtETHD_E_EOR_WrmllpEnrgyLimTestO

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	30.0	45.0	60.0	75.0
1.0	12,896.4	11,266.0	9,635.7	7,461.9	5,831.5	4,201.2	2,570.9

Initial Supporting table - P0128 Maximum Acculated Energy - Secondary

Description: KtETHD_E_EOR_WrmllpEnrgyLimTest1

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	30.0	45.0	60.0	75.0
1.0	12,131.8	9,995.6	7,859.5	5,011.3	2,875.1	739.0	739.0

Initial Supporting table - P0128 Maximum Acculated Energy - Tertiary

Description: KtETHD_E_EOR_WrmllpEnrgyLimTest2

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	30.0	45.0	60.0	75.0
1.0	12,131.8	9,995.6	7,859.5	5,011.3	2,875.1	739.0	739.0

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
-9.0	20.0	20.0	20.0	20.0	20.0
0.0	15.0	15.0	15.0	15.0	15.0
10.0	13.0	13.0	13.0	13.0	13.0
20.0	9.0	9.0	9.0	9.0	9.0
50.0	9.0	9.0	9.0	9.0	9.0

Initial Supporting table - P0234 P0299: Desired torque minimum limit overAmbient pressure to enable the WG deviation diagnosis.

Description: Desired torque minimum limit overAmbient pressure to enable the WG deviation diagnosis.

Value Units: [M] Engine torque threshold
X Unit: [p] KnBSTD_p_WG_DevAmbAirPresBP - Ambient pressure

y/x	60	80	100
1	220	230	240

Initial Supporting table - P0234 P0299: Engine speed minimum limit over Ambient pressure to enable the WG deviation diagnosis.

Description: Engine speed minimum limit over Ambient pressure to enable the WG deviation diagnosis.

Value Units: [rpm] Engine speed threshold
X Unit: [p] KnBSTD_p_WG_DevAmbAirPresBP - Ambient pressure

y/x	60	80	100
1	2,000	1,750	1,500

Supporting table - P0234 P0299: Wastegate position deviation diagnostic enable delay as a function of engine speed and ambient pressure

Description: Timer to stabilize enable conditions for wastegate position deviation diagnosis.

Value Units: [sec] Pressure control deviation diagnosis enable delay.
X Unit: [rpm] KnBSTD_n_WG_DevEngSpdBP - Engine Speed
Y Units: [kPa] KnBSTD_p_WG_DevAmbAirPresBP - Ambient Pressure

y/x	1,500	2,300	3,100	3,900	4,700	5,500	6,300
60	2	1	1	1	1	1	1
80	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1

Initial Supporting table - P0299: Additive offset on WG negative deviation ambient correction.

Description: Additive offset on WG negative deviation ambient correction.

Value Units: [Pct] Position deviation ambient correction
X Unit: [kPa] KnBSTD_p_WG_DevAmbAirPresBP - Ambient Air Pressure
Y Units: [rpm] KnBSTD_n_WG_DevEngSpdBP - Engine Speed

y/x	60.0	80.0	100.0
1,500.0	0.0	0.0	0.0
2,300.0	0.0	0.0	0.0
3,100.0	0.0	0.0	0.0
3,900.0	0.0	0.0	0.0
4,700.0	0.0	0.0	0.0
5,500.0	0.0	0.0	0.0
6,300.0	0.0	0.0	0.0

Initial Supporting table - P0299: WG negative deviation fail threshold over engine speed and desired torque.

Description: WG negative deviation fail threshold over engine speed and desired torque.

Value Units: [Pct] Position deviation threshold
X Unit: [M] KnBSTD_M_WG_DevDsrdTrqBP - Desired Torque
Y Units: [rpm] KnBSTD_n_WG_DevEngSpdBP - Engine Speed

y/x	220	250	280	310	340	370
1,500	-20	-19	-19	-18	-18	-18
2,300	-19	-19	-18	-18	-17	-17
3,100	-19	-18	-18	-18	-17	-17
3,900	-19	-18	-18	-18	-17	-17
4,700	-19	-18	-18	-18	-17	-17
5,500	-18	-17	-17	-17	-17	-17
6,300	-18	-17	-17	-17	-17	-17

Initial Supporting table - P0446 canister vent restriction test displaced purge volume limit

Description: Canister vent restriction diagnostic displaced purge volume (liters) as a function of barometric pressure (kPa)

Value Units: Displaced purge volume (Liters)
X Unit: Barometric pressure (kPa)

y/x	70	80	90	100	110
1	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - P0446 canister vent restriction test tank vacuum threshold

Description: Canister vent restriction diagnostic vacuum failure threshold (Pa) as a function of barometric pressure (kPa)

Value Units: Vacuum (Pa)
X Unit: Barometric pressure (kPa) - 70, 80, 90, 100, 110 kPa

y/x	1	2	3	4	5
1	3,000	3,000	3,000	3,000	3,000

Initial Supporting table - P0455 large leak diagnostic displaced purge volume threshold

Description: Large leak diagnostic displaced purge volume threshold as a function of barometric pressure

Value Units: Displaced purge volume threshold (liters)
X Unit: Barometric pressure (kPa)

y/x	70	80	90	100	110
1	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - P0455 large leak diagnostic tank vacuum threshold

Description: Large leak diagnostic tank vacuum threshold as a function of barometric pressure

Value Units: Vacuum (Pa)
X Unit: Barometric pressure (kPa)

y/x	1	2	3	4	5
1	2,000	2,000	2,000	2,000	2,000

Initial Supporting table - P0496 purge valve leak diagnostic vacuum threshold

Description: Purge valve leak diagnostic vacuum failure threshold (Pa) as a function of barometric pressure (kPa)

Value Units: Vacuum (Pa)
X Unit: Barometric pressure (kPa)

y/x	1	2	3	4	5
1	2,500	2,500	2,500	2,500	2,500

Initial Supporting table - P0496 purge valve leak test time as a function of fuel level and barometric pressure

Description: Purge valve leak test time as a function of fuel level (%) and barometric pressure (kPa)

Value Units: Time (Seconds)
X Unit: Barometric pressure (kPa)
Y Units: Fuel level (%)

y/x	70	80	90	100	110
0	67	67	67	67	67
6	65	65	65	65	65
13	64	64	64	64	64
19	62	62	62	62	62
25	61	61	61	61	61
31	59	59	59	59	59
38	58	58	58	58	58
44	56	56	56	56	56
50	55	55	55	55	55
56	53	53	53	53	53
63	52	52	52	52	52
69	50	50	50	50	50
75	49	49	49	49	49
81	47	47	47	47	47
88	46	46	46	46	46
94	44	44	44	44	44
100	43	43	43	43	43

Initial Supporting table - P0521_CVDOP_MaxOilPressure

Description: Maximum oil pressure threshold.

X Unit: Engine Speed, RPM

y/x	40	50	60	70	80	90	100	110	120
1,000	610	610	610	610	610	610	610	610	610
1,500	610	610	610	610	610	610	610	610	610
2,000	610	610	610	610	610	610	610	610	610
2,500	610	610	610	610	610	610	610	610	610
3,000	610	610	610	610	610	610	610	610	610
3,500	610	610	610	610	610	610	610	610	610
4,000	610	610	610	610	610	610	610	610	610
4,500	610	610	610	610	610	610	610	610	610
5,000	610	610	610	610	610	610	610	610	610

Initial Supporting table - P0521_CVDOP_MinOilPresFail

Description: Minimum Oil Pressure fail Threshold

X Unit: Engine Speed (RPM)

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000
1	73	73	73	83	98	108	113	113	169

Initial Supporting table - P06DD_CVDOP_MaxDesPress

Description: The maximum desired pressure, above which the stuck diagnostic will be disabled.

Value Units: Desired oil pressure, kPa
X Unit: Engine oil temperature, °C

y/x	-20	0	20	40	60	80	100	120	140
1	508	432	408	408	408	408	408	408	408

Initial Supporting table - P06D)D_CVDOP_MaxPressErr

Description: Error threshold to set the oil pump performance fault.

Value Units: Absolute Oil Pressure Error, kPa
X Unit: Engine Speed, RPM
Y Units: Engine oil temperature, °C

y/x	600	1,000	1,500	2,000	3,000	4,200	4,201	5,000	6,000
-20	120	120	110	100	90	80	80	70	70
0	105	105	100	90	80	70	70	60	60
20	100	100	90	65	65	60	60	60	60
40	50	50	50	50	50	53	70	55	55
60	50	50	50	50	50	53	70	55	55
80	50	50	50	50	50	53	70	55	55
100	60	50	50	50	50	53	75	55	55
120	50	50	50	50	50	53	75	55	55
140	50	50	50	50	50	53	80	55	55

Initial Supporting table - P06DD_CVDOP_MinDesPres

Description: The minimum desired pressure, below which the stuck diagnostic will be disabled.

Value Units: Desired oil pressure, kPa
X Unit: Engine oil temperature, °C

y/x	-20	0	20	40	60	80	100	120	140
1	200	200	175	145	145	145	145	145	145

Initial Supporting table - P219A EWMA Coefficient

Description: The bank 1 EWMA coefficient used to filter the AFIM Variance Ratio.

Value Units: Unitless Scalar
X Unit: Unitless Scalar

y/x	-1.00	-0.50	0.00	0.50	1.00
1	0.06	0.06	0.06	0.06	0.06

Initial Supporting table - P219A EWMA Coefficient Opt Table

Description: The bank 1 EWMA coefficient used to filter the AFIM Variance Ratio while in Optional Mode, if used.

Value Units: Unitless Scalar
X Unit: Unitless Scalar

y/x	-1.00	-0.50	0.00	0.50	1.00
1.0	0.05	0.05	0.05	0.05	0.05

Initial Supporting table - P219A Quality Factor Bank1 Table

Description: Bank 1 lookup table of Quality Factors used in the calculation of the Ratio for the current sample period

Value Units: Unitless Scalar
X Unit: Engine Speed (RPM)
Y Units: Air Per Cylinder (APC) (mg/cylinder)

y/x	600	920	1,240	1,560	1,880	2,200	2,520	2,840	3,160	3,480	3,800	4,120	4,440	4,760	5,080	5,400	5,720
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
240	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
280	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
680	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - P26CE Pump Overspeed Fail Threshold

Description:

Value Units: Pump overspeed failure threshold (RPM)
X Unit: Commanded pump speed (RPM)

y/x	0	300	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	0	-200	-200	-200	-300	-400	-500	-600	-700	-800

Initial Supporting table - P26CE Pump Overspeed Fail Threshold Low Voltage

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	300	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999	-9,999

Initial Supporting table - P2B85 Pump Underspeed Fail Threshold

Description: Pump underspeed failure threshold as a function of pump requested speed

Value Units: Pump underspeed failure threshold (RPM)
X Unit: Commanded pump speed (RPM)

y/x	0	300	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	200	200	200	200	300	400	500	600	700	800

Initial Supporting table - P2B85 Pump Underspeed Fail Threshold Low Voltage

Description: Pump underspeed failure threshold in a low voltage condition as a function of pump requested speed

Value Units: Pump underspeed failure threshold low voltage (RPM)
X Unit: Commanded pump speed (RPM)

y/x	0	300	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	9,999	9,999	9,999	9,999	9,999	9,999	9,999	9,999	9,999	9,999

Initial Supporting table - P3075 3076 Pump Current Performance Coolant Distribution Mode

Description: Current performance intrusive test enable condition as a function of coolant distribution mode selection

Value Units: Coolant distribution mode selection to enable diagnostic
X Unit: Coolant distribution mode enumeration

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

Initial Supporting table - P3075 3076 Pump Current Performance Coolant System Mode Select

Description: Current performance intrusive test enable condition as a function of coolant system mode selection

Value Units: Coolant system mode selection to enable diagnostic
X Unit: Coolant System Mode Enumeration

y/x	0	1	2	3	4	5	6	7	8	9	10
1	0	0	0	1	0	0	0	0	1	1	1

Initial Supporting table - P3075 3076 Pump Current Scaled

Description: Pump current scaled based on engine inlet coolant temperature

Value Units: Pump current scaled (A)
X Unit: Engine inlet coolant temperature (Deg C)

y/x	40	50	60	70	80	90	100	110	120	130
1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Initial Supporting table - P3075 Pump Low Current Passive Test Fail Threshold

Description: Low current passive test failure threshold as a function of pump command speed and flow restriction

Value Units: Pump passive test low current failure threshold (A)
X Unit: Coolant Flow Restriction (Unitless)
Y Units: Commanded Pump Speed (RPM)

y/x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
810	1	1	3	3	3	3	3	3	3	3
1,000	1	1	3	3	3	3	3	3	3	3
1,250	1	1	3	3	3	3	3	3	4	4
1,600	1	1	4	4	4	4	4	5	5	5
2,000	1	1	5	5	5	6	6	6	6	6
2,500	1	1	7	7	8	8	9	9	9	9
3,000	1	1	9	10	11	12	12	13	13	13
4,000	1	1	15	17	18	19	20	21	22	22
5,000	1	1	23	25	27	30	31	33	34	34
6,180	1	1	35	39	42	46	48	50	52	52

Initial Supporting table - P3075 Pump Low Current Performance Failure Threshold

Description: Low current performance failure threshold as a function of coolant restriction correction

Value Units: Pump low current failure threshold (A)
X Unit: Coolant restriction correction

y/x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1	1.0	1.0	15.2	16.6	17.9	19.9	20.7	21.7	22.6	23.0

Initial Supporting table - P3076 Pump High Current Passive Test Fail Threshold

Description: High current passive test failure threshold as a function of pump command speed and flow restriction

Value Units: Pump passive test high current failure threshold (A)
X Unit: Coolant Flow Restriction (Unitless)
Y Units: Commanded Pump Speed (RPM)

y/x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
810	80	80	4	4	4	4	5	5	5	5
1,000	80	80	4	4	5	5	5	5	5	5
1,250	80	80	5	5	5	5	5	6	6	6
1,600	80	80	6	6	6	7	7	7	8	8
2,000	80	80	8	8	9	9	10	10	10	10
2,500	80	80	10	11	12	13	14	14	15	15
3,000	80	80	14	15	16	18	19	19	20	21
4,000	80	80	23	25	27	30	31	32	34	35
5,000	80	80	35	38	42	46	48	50	52	54
6,180	80	80	54	59	64	71	74	78	80	80

Initial Supporting table - P3076 Pump High Current Performance Failure Threshold

Description:

Value Units: Pump high current failure threshold (A)
X Unit: Coolant restriction correction

y/x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1	80.0	80.0	22.9	24.9	26.9	29.8	31.1	32.5	33.9	34.6

Initial Supporting table - Purge Pump Diagnostic IAT Multiplier Factor

Description: Purge pump diagnostic IAT multiplier factor as a function of intake air temperature (deg C)

Value Units: Purge pump diagnostic IAT multiplier factor (unitless)
X Unit: Intake air temperature (deg C)

y/x	-40	-20	0	20	40	60	80	100	120
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Purge Pump Misassembled Failure Threshold

Description: Misassembled failure threshold (kPa) as a function of barometric pressure (kPa) and purge pump speed (RPM)

Value Units: Misassembled failure threshold (kPa)
X Unit: Barometric pressure (kPa)
Y Units: Purge pump speed (RPM)

y/x	70	80	90	100	110
35,000	0.5	0.5	0.5	0.5	0.5
36,000	0.5	0.5	0.5	0.5	0.5
37,000	0.6	0.6	0.6	0.6	0.6
38,000	0.6	0.6	0.6	0.6	0.6
39,000	0.6	0.6	0.6	0.6	0.6
40,000	0.7	0.7	0.7	0.7	0.7
41,000	0.7	0.7	0.7	0.7	0.7
42,000	0.7	0.7	0.7	0.7	0.7
43,000	0.8	0.8	0.8	0.8	0.8
44,000	0.8	0.8	0.8	0.8	0.8
45,000	0.8	0.8	0.8	0.8	0.8
46,000	0.9	0.9	0.9	0.9	0.9
47,000	0.9	0.9	0.9	0.9	0.9
48,000	0.9	0.9	0.9	0.9	0.9
49,000	1.0	1.0	1.0	1.0	1.0
50,000	1.0	1.0	1.0	1.0	1.0
51,000	1.1	1.1	1.1	1.1	1.1

Initial Supporting table - Purge pump performance high flow ratio threshold

Description: Purge pump flow ratio = estimated purge flow as func(pressure across purge solenoid valve) / failure threshold purge flow as func(purge valve duty cycle, barometric pressue)

Value Units: Purge pump flow ratio (unitless)
X Unit: Barometric pressure (kPa)
Y Units: Purge solenoid duty cycle (Percent)

y/x	70	80	90	100	110
0	14.4	16.2	18.0	20.1	21.7
6	14.4	16.2	18.0	20.1	21.7
12	14.4	16.2	18.0	20.1	21.7
18	14.4	16.2	18.0	20.1	21.7
24	14.4	16.2	18.0	20.1	21.7
30	14.4	16.2	18.0	20.1	21.7
36	14.4	16.2	18.0	20.1	21.6
42	14.3	16.1	17.9	20.0	21.6
48	14.2	16.0	17.8	19.8	21.4
54	14.1	15.9	17.6	19.6	21.2
60	13.9	15.7	17.4	19.4	20.9
66	13.7	15.4	17.2	19.1	20.6
72	13.5	15.2	16.9	18.8	20.2
78	13.3	14.9	16.6	18.4	19.9
84	13.0	14.6	16.2	18.0	19.5
90	12.7	14.2	15.8	17.6	19.2
100	12.2	13.7	15.2	16.9	18.6

Initial Supporting table - Purge pump performance low flow ratio threshold

Description: Purge pump flow ratio = Estimated purge flow as func(pressure across purge solenoid valve) / failure threshold purge flow as func(purge valve duty cycle, barometric pressure)

Value Units: Purge pump flow ratio (unitless)
X Unit: Barometric pressure (kPa)
Y Units: Purge solenoid duty cycle (Percent)

y/x	70	80	90	100	110
0	2.2	2.3	2.4	2.5	2.6
6	2.1	2.2	2.3	2.4	2.5
12	2.0	2.1	2.2	2.3	2.4
18	1.9	2.0	2.2	2.3	2.4
24	1.9	2.0	2.1	2.2	2.3
30	1.8	1.9	2.0	2.1	2.2
36	1.7	1.8	1.9	2.0	2.1
42	1.6	1.7	1.8	1.9	2.1
48	1.5	1.6	1.7	1.9	2.0
54	1.4	1.5	1.7	1.8	1.9
60	1.3	1.5	1.6	1.7	1.8
66	1.2	1.4	1.5	1.6	1.7
72	1.2	1.3	1.4	1.5	1.7
78	1.1	1.2	1.3	1.5	1.6
84	1.0	1.1	1.2	1.4	1.5
90	0.9	1.0	1.2	1.3	1.4
100	0.9	1.0	1.2	1.3	1.4

Initial Supporting table - Purge pump speed on value too high

Description: Purge pump speed (RPM) error limit as a function of purge pump voltage (volts)

Value Units: Purge pump speed (RPM)
X Unit: Purge pump voltage (volts)

y/x	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000	46,000

Initial Supporting table - Purge pump speed on value too low

Description: Purge pump speed (RPM) error limit as a function of purge pump voltage (volts)

Value Units: Purge pump speed (RPM)
X Unit: Purge pump voltage (volts)

y/x	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	29,400	29,400	29,400	32,100	34,700	36,700	38,600	39,300	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000

Initial Supporting table - Purge System High Purge Flow Enable

Description: Purge gas flow ratio (unitless) as a function of barometric pressure (kPa)

Value Units: Purge pump flow ratio (unitless)
X Unit: Barometric pressure (kPa)

y/x	1	2	3	4	5
1	1.1	1.1	1.1	1.1	1.1
2	1.1	1.1	1.1	1.1	1.1
3	1.1	1.1	1.1	1.1	1.1
4	1.1	1.1	1.1	1.1	1.1
5	1.1	1.1	1.1	1.1	1.1
6	1.1	1.1	1.1	1.1	1.1
7	1.1	1.1	1.1	1.1	1.1
8	1.1	1.1	1.1	1.1	1.1
9	1.1	1.1	1.1	1.1	1.1
10	1.1	1.1	1.1	1.1	1.1
11	1.1	1.1	1.1	1.1	1.1
12	1.1	1.1	1.1	1.1	1.1
13	1.1	1.1	1.1	1.1	1.1
14	1.1	1.1	1.1	1.1	1.1
15	1.1	1.1	1.1	1.1	1.1
16	1.1	1.1	1.1	1.1	1.1
17	1.1	1.1	1.1	1.1	1.1

Initial Supporting table - Purge System High Purge Flow Remain Enabled

Description: Purge gas flow ratio (unitless) as a function of barometric pressure (kPa)

Value Units: Purge pump flow ratio (unitless)
X Unit: Barometric pressure (kPa)

y/x	1	2	3	4	5
1	1.2	1.2	1.2	1.2	1.2
2	1.2	1.2	1.2	1.2	1.2
3	1.2	1.2	1.2	1.2	1.2
4	1.2	1.2	1.2	1.2	1.2
5	1.2	1.2	1.2	1.2	1.2
6	1.2	1.2	1.2	1.2	1.2
7	1.2	1.2	1.2	1.2	1.2
8	1.2	1.2	1.2	1.2	1.2
9	1.2	1.2	1.2	1.2	1.2
10	1.2	1.2	1.2	1.2	1.2
11	1.2	1.2	1.2	1.2	1.2
12	1.2	1.2	1.2	1.2	1.2
13	1.2	1.2	1.2	1.2	1.2
14	1.2	1.2	1.2	1.2	1.2
15	1.2	1.2	1.2	1.2	1.2
16	1.2	1.2	1.2	1.2	1.2
17	1.2	1.2	1.2	1.2	1.2

Initial Supporting table - Purge System Low Purge Flow Enable

Description: Purge gas flow ratio (unitless) as a function of barometric pressure (kPa)

Value Units: Purge pump flow ratio (unitless)
X Unit: Barometric pressure (kPa)

y/x	1	2	3	4	5
1	-0.1	-0.1	-0.1	-0.1	-0.1
2	-0.1	-0.1	-0.1	-0.1	-0.1
3	-0.1	-0.1	-0.1	-0.1	-0.1
4	-0.1	-0.1	-0.1	-0.1	-0.1
5	-0.1	-0.1	-0.1	-0.1	-0.1
6	-0.1	-0.1	-0.1	-0.1	-0.1
7	-0.1	-0.1	-0.1	-0.1	-0.1
8	-0.1	-0.1	-0.1	-0.1	-0.1
9	-0.1	-0.1	-0.1	-0.1	-0.1
10	-0.1	-0.1	-0.1	-0.1	-0.1
11	-0.1	-0.1	-0.1	-0.1	-0.1
12	-0.1	-0.1	-0.1	-0.1	-0.1
13	-0.1	-0.1	-0.1	-0.1	-0.1
14	-0.1	-0.1	-0.1	-0.1	-0.1
15	-0.1	-0.1	-0.1	-0.1	-0.1
16	-0.1	-0.1	-0.1	-0.1	-0.1
17	-0.1	-0.1	-0.1	-0.1	-0.1

Initial Supporting table - Purge System Low Purge Flow Remain Enabled

Description: Purge gas flow ratio (unitless) as a function of barometric pressure (kPa)

Value Units: Purge pump flow ratio (unitless)
X Unit: Barometric pressure (kPa)

y/x	1	2	3	4	5
1	-0.2	-0.2	-0.2	-0.2	-0.2
2	-0.2	-0.2	-0.2	-0.2	-0.2
3	-0.2	-0.2	-0.2	-0.2	-0.2
4	-0.2	-0.2	-0.2	-0.2	-0.2
5	-0.2	-0.2	-0.2	-0.2	-0.2
6	-0.2	-0.2	-0.2	-0.2	-0.2
7	-0.2	-0.2	-0.2	-0.2	-0.2
8	-0.2	-0.2	-0.2	-0.2	-0.2
9	-0.2	-0.2	-0.2	-0.2	-0.2
10	-0.2	-0.2	-0.2	-0.2	-0.2
11	-0.2	-0.2	-0.2	-0.2	-0.2
12	-0.2	-0.2	-0.2	-0.2	-0.2
13	-0.2	-0.2	-0.2	-0.2	-0.2
14	-0.2	-0.2	-0.2	-0.2	-0.2
15	-0.2	-0.2	-0.2	-0.2	-0.2
16	-0.2	-0.2	-0.2	-0.2	-0.2
17	-0.2	-0.2	-0.2	-0.2	-0.2

Initial Supporting table - TimeForOilAeration

Description: The timer limit to declare an engine oil aeration condition exists.

X Unit: Engine oil temperature (deg C)

y/x	-40	-20	0	25	35	60	80	100	120	130	140
1	30	30	30	30	30	30	30	30	30	30	30

Initial Supporting table - P'129F Threshold High

Description: P129F Filtered Fuel Pump Speed Error High Threshold [over-performing motor]
Instantaneously calculated filtered pump speed error measured is higher than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
2,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
3,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
4,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
5,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
6,000.0	-600.0	-600.0	-600.0	-600.0	-600.0
7,000.0	-600.0	-600.0	-600.0	-600.0	-600.0

Initial Supporting table - P129F Threshold Low

Description: P129F Filtered Fuel Pump Speed Error Low Threshold [under-performing motor]
Instantaneously calculated filtered pump speed error measured is lower than commanded

Value Units: revs / min
X Unit: revs / min [commanded pump speed]
Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	600.0	600.0	600.0	600.0	600.0
2,000.0	600.0	600.0	600.0	600.0	600.0
3,000.0	600.0	600.0	600.0	600.0	600.0
4,000.0	600.0	600.0	600.0	600.0	600.0
5,000.0	600.0	600.0	600.0	600.0	600.0
6,000.0	600.0	600.0	600.0	600.0	600.0
7,000.0	1,575.0	1,575.0	1,575.0	1,575.0	1,575.0

Initial Supporting table - P3187_Threshold

Description: P3187 Filtered Fuel Pressure Error Threshold [under-performing pump]

Value Units: kilo Pascals
X Unit: kPa [commanded fuel pressure]
Y Units: grams / sec [fuel flow]

y/x	200.00	250.00	300.00	350.00	400.00	450.00	500.00	550.00	600.00
0.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
1.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
3.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
4.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
6.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
7.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
9.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
10.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
12.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
13.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
15.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
16.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
18.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
19.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
21.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
22.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
24.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
25.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
27.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
28.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
30.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
31.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
33.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
34.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
36.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
37.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
39.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
40.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
42.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
43.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
45.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00

Initial Supporting table • P3187_Threshold

46.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00
48.00	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00

Initial Supporting table - P3188_Threshold

Description: P3188 Filtered Fuel Pressure Error Threshold [over-performing pump]

Value Units: kilo pascals [kPa]
X Unit: kPa [commanded fuel pressure]
Y Units: grams/sec [fuel flow]

y/x	200.00	250.00	300.00	350.00	400.00	450.00	500.00	550.00	600.00
0.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
1.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
3.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
4.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
6.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
7.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
9.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
10.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
12.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
13.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
15.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
16.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
18.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
19.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
21.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
22.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
24.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
25.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
27.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
28.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
30.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
31.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
33.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
34.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
36.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
37.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
39.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
40.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
42.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
43.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
45.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00

Initial Supporting table • P3188_Threshold

46.50	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00
48.00	-490.00	-440.00	-390.00	-340.00	-290.00	-240.00	-190.00	-140.00	-90.00

Initial Supporting table - DFCO Active Maximum Time (seconds)

Description: DFCO active maximum time versus engine airflow (gps)

Value Units: Time (seconds)
X Unit: Engine airflow (gps)

y/x	2	3	4	6	8	10	12	14	16	18	20	25	30	35	40	50	60
1	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Initial Supporting table - DFCO Active Minimum Time (seconds)

Description: DFCO active minimum time versus engine airflow (gps)

Value Units: Time (seconds)
X Unit: Engine airflow (gps)

y/x	2	3	4	6	8	10	12	14	16	18	20	25	30	35	40	50	60
1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Initial Supporting table - Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests

Description: This table describes the adaptive (Block Learn) cells in which to enable the Post (Secondary) Oxygen sensor response tests.
Note: When the table column heading matches the calibration value below it, that individual cell is enabled.

The cell numbers in the table are defined as:
CeFADR_e_CellOO_PurgOnAirMode5= 0,
CeFADR_e_Cell01_PurgOnAirMode4 = 1,
CeFADR_e_Cell02_PurgOnAirMode3 = 2,
CeFADR_e_Cell03_PurgOnAirMode2 = 3,
CeFADR_e_Cell04_PurgOnAirMode1 = 4,
CeFADR_e_Cell05_PurgOnAirModeO= 5,
CeFADR_e_Cell06_PurgOnIdle = 6,
CeFADR_e_Cell07_PurgOnDecel = 7,
CeFADR_e_Cell08_PurgOffAirMode5 = 8,
CeFADR_e_Cell09_PurgOffAirMode4 = 9,
CeFADR_e_Cell10_PurgOffAirMode3 = 10,
CeFADR_e_Cell11_PurgOffAirMode2 = 11,
CeFADR_e_Cell12_PurgOffAirMode1 = 12,
CeFADR_e_Cell13_PurgOffAirModeO= 13,
CeFADR_e_Cell14_PurgOffIdle = 14,
CeFADR_e_Cell15_PurgOffDecel = 15

Value Units: Block Learn cell number
X Unit: Block Learn cell number

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

Initial Supporting table - Multiple DTC Use Green Sensor Delay Criteria - Limit

Description: This Calibration is the acculmulated airflow limit above which the Green condition is expired
Used for: P0133, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P0153, P015A, P015B, P015C, P015D, P1133, P1153, P2270, P2271, P2272 and P2273.
Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.

Value Units: Grams
X Unit: Acculmulated Engine Airflow

y/x	CiOXYR_O2_Bank1_Sensor1	CiOXYR_O2_Bank1_Sensor2	CiOXYR_O2_Bank2_Sensor1	CiOXYR_O2_Bank2_Sensor2
1	120,000	120,000	120,000	120,000

Initial Supporting table - POOI1_CamPosErrorLimIc1

Description: Maximum Intake Cam 1 phase error as a function of engine speed and engine oil temperature.

Value Units: Maximum Intake Cam 1 phase error (degCAM)
X Unit: Engine Oil Temperature (degC)
Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Initial Supporting table - P0011_P0021_P05CC_P05CD_EngOilPressEnblIc

Description: Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

Value Units: Time (sec)
X Unit: Engine Coolant Temperature (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8	8	6	4	3	3	3	3	1	1	1	1	1	1	1	2	2

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdHiDsbllc

Description: Minimum engine speed to disable Intake cam

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdLoEnbllc

Description: Maximum engine speed to enable Intake cam - works as hysteresis.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresHiEnbllc

Description: Intake cam is enabled when oil pressure exceeds this value

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	200	200	180	160	150	150	150	150	150	150	150	150	150	150	150	150	150

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresLoDsbllc

Description: Intake cam is disabled when oil pressure falls below this value

Value Units: Engine Oil Pressure (kPa)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmHiEnbllc

Description: Intake cam is enabled when engine speed exceeds this value.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmLoDsbllc

Description: Intake cam is disabled when engine speed is below this value.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

Initial Supporting table - P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning

Description: Engine running time must be greater than this threshold during a cold start to enable cam phasing

Value Units: Time (sec)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8	8	8	4	3	2	2	2	1	1	1	1	1	1	1	2	2

Initial Supporting table - P0011_P(05CC_StablePositionTimeIc1

Description: Minimum time for Intake Cam 1 phase position to be stable to enable performance diagnostic.

Value Units: Minimum time (sec)
X Unit: Engine Oil Temperature (degC)
Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Initial Supporting table - P00114_CamPosErrorLimEc1

Description: Maximum Exhaust Cam 1 phase error as a function of engine speed and engine oil temperature.

Value Units: Maximum Exhaust Cam 1 phase error (degCAM)
X Unit: Engine Oil Temperature (degC)
Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,200	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,600	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,000	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,400	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,800	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Initial Supporting table - P0014_P0024_P05CE_P05CF_EngOilPressEnblEc

Description: Delay time before the oil pressure enable flag is set assuming all the oil pressure enable criteria are met

Value Units: Time (sec)
X Unit: Engine Coolant Temperature (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8	8	6	4	3	3	3	3	1	1	1	1	1	1	1	2	2

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc

Description: Exhaust cam is disabled when engine speed exceeds this value

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc

Description: Exhaust cam is enabled when engine speed remains below this value

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresHiEnblEc

Description: Exhaust cam is enabled when oil pressure exceeds this value

Value Units: Engine Oil Pressure (kPa)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	200	200	180	160	150	150	150	150	150	150	150	150	150	150	150	150	150

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresLoDsblEc

Description: Exhaust cam is disabled when oil pressure falls below this value

Value Units: Engine Oil Pressure (kPa)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc

Description: Exhaust cam is enabled when engine speed exceeds this value.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc

Description: Exhaust cam is disabled when engine speed is below this value.

Value Units: Engine Speed (rpm)
X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350

Initial Supporting table - P0014_PO)5CE_StablePositionTimeEc1

Description: Minimum time for Exhaust Cam 1 phase position to be stable to enable performance diagnostic.

Value Units: Minimum time (sec)
X Unit: Engine Oil Temperature (degC)
Y Units: Engine Speed (rpm)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
4,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5,200	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5,600	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,000	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,400	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6,800	100.0	80.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Initial Supporting table - P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

Description: P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold

Value Units: Engine Run Time- Seconds
X Unit: Oil Temperature- C

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	35.0	10.0	7.0	5.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0

Initial Supporting table - P0016-0019 Mid-Park Phaser Delay

Description: P0016-0019 Mid-Park Phaser Park Delay. Total delay is twice the calibration value as both 'hi' side and 'lo' side park check sequences are delayed by the stated calibration values

Value Units: Time - seconds
X Unit: Oil Temperature - degC

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	50.0	24.0	14.0	10.0	6.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.0	4.0

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Off

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Running

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine running

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)
Y Units: Engine Air Flow (Grams/Second)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
5.0	-5.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
10.0	-4.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
20.0	-2.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
30.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
40.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
50.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
60.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
70.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0

Initial Supporting table - P00C4 P2261: Compressor Surge Line

Description: Turbo compressor recirculation valve diagnosis surge area limit.

Value Units: [ratio] CRV diagnosis surge area limit.
X Unit: [g/sec[] KnBSTD_dm_AirFlowBP - Air FLow

y/x	5.00	10.00	25.00	35.00	50.00	85.00
1	1.030	1.190	1.390	1.610	2.060	3.150

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

Description: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix - This table describes combinations of individual model failures that will set P0101, P0106, P010B, P0121, P0236 and P1101 on turbocharged applications.

Value Units: Boolean
X Unit: Unitless (See top line for heading information)
Y Units: Unitless

y/x	1	2	3	4	5	6	7	8	9
1	MAF Model	MAPI Model	MAP2 Model	MAP3 Model	TIAP1 Model	TPS Model	TIAP Correlation	TIAP Correlation	DTC Set
2	Failed	Failed	Failed	Failed	Failed	Failed	Failed	Valid	
3	F	F	F	F	F	F	F	F	No DTC
4	F	F	F	F	F	F	F	T	No DTC
5	F	F	F	F	F	F	T	F	No DTC
6	F	F	F	F	F	F	T	T	No DTC
7	F	F	F	F	F	T	F	F	No DTC
8	F	F	F	F	F	T	F	T	No DTC
9	F	F	F	F	F	T	T	F	No DTC
10	F	F	F	F	F	T	T	T	No DTC
11	F	F	F	F	T	F	F	F	No DTC
12	F	F	F	F	T	F	F	T	No DTC
13	F	F	F	F	T	F	T	F	No DTC
14	F	F	F	F	T	F	T	T	No DTC
15	F	F	F	F	T	T	F	F	P1101
16	F	F	F	F	T	T	F	T	P0121
17	F	F	F	F	T	T	T	F	P1101
18	F	F	F	F	T	T	T	T	P0236
19	F	F	F	T	F	F	F	F	No DTC
20	F	F	F	T	F	F	F	T	No DTC
21	F	F	F	T	F	F	T	F	P1101
22	F	F	F	T	F	F	T	T	P1101
23	F	F	F	T	F	T	F	F	P1101
24	F	F	F	T	F	T	F	T	P1101
25	F	F	F	T	F	T	T	F	P1101
26	F	F	F	T	F	T	T	T	P1101
27	F	F	F	T	T	F	F	F	P1101
28	F	F	F	T	T	F	F	T	P1101
29	F	F	F	T	T	F	T	F	P1101
30	F	F	F	T	T	F	T	T	P1101
31	F	F	F	T	T	T	F	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

32	F	F	F	T	T	T	F	T	P1101
33	F	F	F	T	T	T	T	F	P1101
34	F	F	F	T	T	T	T	T	P1101
35	F	F	T	F	F	F	F	F	No DTC
36	F	F	T	F	F	F	F	T	No DTC
37	F	F	T	F	F	F	T	F	P1101
38	F	F	T	F	F	F	T	T	P1101
39	F	F	T	F	F	T	F	F	P1101
40	F	F	T	F	F	T	F	T	P1101
41	F	F	T	F	F	T	T	F	P1101
42	F	F	T	F	F	T	T	T	P1101
43	F	F	T	F	T	F	F	F	P1101
44	F	F	T	F	T	F	F	T	P1101
45	F	F	T	F	T	F	T	F	P1101
46	F	F	T	F	T	F	T	T	P1101
47	F	F	T	F	T	T	F	F	P1101
48	F	F	T	F	T	T	F	T	P1101
49	F	F	T	F	T	T	T	F	P1101
50	F	F	T	F	T	T	T	T	P1101
51	F	F	T	T	F	F	F	F	P1101
52	F	F	T	T	F	F	F	T	P1101
53	F	F	T	T	F	F	T	F	P1101
54	F	F	T	T	F	F	T	T	P1101
55	F	F	T	T	F	T	F	F	P1101
56	F	F	T	T	F	T	F	T	P1101
57	F	F	T	T	F	T	T	F	P1101
58	F	F	T	T	F	T	T	T	P1101
59	F	F	T	T	T	F	F	F	No DTC
60	F	F	T	T	T	F	F	T	No DTC
61	F	F	T	T	T	F	T	F	No DTC
62	F	F	T	T	T	F	T	T	No DTC
63	F	F	T	T	T	T	F	F	P1101
64	F	F	T	T	T	T	F	T	P1101
65	F	F	T	T	T	T	T	F	P1101
66	F	F	T	T	T	T	T	T	P1101
67	F	T	F	F	F	F	F	F	No DTC
68	F	T	F	F	F	F	F	T	No DTC
69	F	T	F	F	F	F	T	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

70	F	T	F	F	F	F	T	T	P0236
71	F	T	F	F	F	T	F	F	P1101
72	F	T	F	F	F	T	F	T	P0121
73	F	T	F	F	F	T	T	F	P1101
74	F	T	F	F	F	T	T	T	P0236
75	F	T	F	F	T	F	F	F	P1101
76	F	T	F	F	T	F	F	T	P1101
77	F	T	F	F	T	F	T	F	P1101
78	F	T	F	F	T	F	T	T	P0236
79	F	T	F	F	T	T	F	F	P1101
80	F	T	F	F	T	T	F	T	P0121
81	F	T	F	F	T	T	T	F	P1101
82	F	T	F	F	T	T	T	T	P0236
83	F	T	F	T	F	F	F	F	P1101
84	F	T	F	T	F	F	F	T	P1101
85	F	T	F	T	F	F	T	F	P1101
86	F	T	F	T	F	F	T	T	P1101
87	F	T	F	T	F	T	F	F	P1101
88	F	T	F	T	F	T	F	T	P1101
89	F	T	F	T	F	T	T	F	P1101
90	F	T	F	T	F	T	T	T	P1101
91	F	T	F	T	T	F	F	F	P1101
92	F	T	F	T	T	F	F	T	P1101
93	F	T	F	T	T	F	T	F	P1101
94	F	T	F	T	T	F	T	T	P1101
95	F	T	F	T	T	T	F	F	P1101
96	F	T	F	T	T	T	F	T	P1101
97	F	T	F	T	T	T	T	F	P1101
98	F	T	F	T	T	T	T	T	P1101
99	F	T	T	F	F	F	F	F	P1101
100	F	T	T	F	F	F	F	T	P1101
101	F	T	T	F	F	F	T	F	P1101
102	F	T	T	F	F	F	T	T	P1101
103	F	T	T	F	F	T	F	F	P1101
104	F	T	T	F	F	T	F	T	P1101
105	F	T	T	F	F	T	T	F	P1101
106	F	T	T	F	F	T	T	T	P1101
107	F	T	T	F	T	F	F	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

108	F	T	T	F	T	F	F	T	P1101
109	F	T	T	F	T	F	T	F	P1101
110	F	T	T	F	T	F	T	T	P1101
111	F	T	T	F	T	T	F	F	P1101
112	F	T	T	F	T	T	F	T	P1101
113	F	T	T	F	T	T	T	F	P1101
114	F	T	T	F	T	T	T	T	P1101
115	F	T	T	T	F	F	F	F	P0106
116	F	T	T	T	F	F	F	T	P0106
117	F	T	T	T	F	F	T	F	P0106
118	F	T	T	T	F	F	T	T	P0106
119	F	T	T	T	F	T	F	F	P1101
120	F	T	T	T	F	T	F	T	P1101
121	F	T	T	T	F	T	T	F	P1101
122	F	T	T	T	F	T	T	T	P1101
123	F	T	T	T	T	F	F	F	P1101
124	F	T	T	T	T	F	F	T	P1101
125	F	T	T	T	T	F	T	F	P1101
126	F	T	T	T	T	F	T	T	P1101
127	F	T	T	T	T	T	F	F	P1101
128	F	T	T	T	T	T	F	T	P1101
129	F	T	T	T	T	T	T	F	P1101
130	F	T	T	T	T	T	T	T	P1101
131	T	F	F	F	F	F	F	F	No DTC
132	T	F	F	F	F	F	F	T	No DTC
133	T	F	F	F	F	F	T	F	P1101
134	T	F	F	F	F	F	T	T	P0236
135	T	F	F	F	F	T	F	F	P1101
136	T	F	F	F	F	T	F	T	P0121
137	T	F	F	F	F	T	T	F	P1101
138	T	F	F	F	F	T	T	T	P0236
139	T	F	F	F	T	F	F	F	P1101
140	T	F	F	F	T	F	F	T	P1101
141	T	F	F	F	T	F	T	F	P1101
142	T	F	F	F	T	F	T	T	P0236
143	T	F	F	F	T	T	F	F	P1101
144	T	F	F	F	T	T	F	T	P0121
145	T	F	F	F	T	T	T	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

146	T	F	F	F	T	T	T	T	P0236
147	T	F	F	T	F	F	F	F	P1101
148	T	F	F	T	F	F	F	T	P1101
149	T	F	F	T	F	F	T	F	P1101
150	T	F	F	T	F	F	T	T	P1101
151	T	F	F	T	F	T	F	F	P1101
152	T	F	F	T	F	T	F	T	P1101
153	T	F	F	T	F	T	T	F	P1101
154	T	F	F	T	F	T	T	T	P1101
155	T	F	F	T	T	F	F	F	P1101
156	T	F	F	T	T	F	F	T	P1101
157	T	F	F	T	T	F	T	F	P1101
158	T	F	F	T	T	F	T	T	P1101
159	T	F	F	T	T	T	F	F	P1101
160	T	F	F	T	T	T	F	T	P1101
161	T	F	F	T	T	T	T	F	P1101
162	T	F	F	T	T	T	T	T	P1101
163	T	F	T	F	F	F	F	F	P1101
164	T	F	T	F	F	F	F	T	P1101
165	T	F	T	F	F	F	T	F	P1101
166	T	F	T	F	F	F	T	T	P1101
167	T	F	T	F	F	T	F	F	P1101
168	T	F	T	F	F	T	F	T	P1101
169	T	F	T	F	F	T	T	F	P1101
170	T	F	T	F	F	T	T	T	P1101
171	T	F	T	F	T	F	F	F	P1101
172	T	F	T	F	T	F	F	T	P1101
173	T	F	T	F	T	F	T	F	P1101
174	T	F	T	F	T	F	T	T	P1101
175	T	F	T	F	T	T	F	F	P1101
176	T	F	T	F	T	T	F	T	P1101
177	T	F	T	F	T	T	T	F	P1101
178	T	F	T	F	T	T	T	T	P1101
179	T	F	T	T	F	F	F	F	P1101
180	T	F	T	T	F	F	F	T	P1101
181	T	F	T	T	F	F	T	F	P1101
182	T	F	T	T	F	F	T	T	P1101
183	T	F	T	T	F	T	F	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

184	T	F	T	T	F	T	F	T	P1101
185	T	F	T	T	F	T	T	F	P1101
186	T	F	T	T	F	T	T	T	P1101
187	T	F	T	T	T	F	F	F	P0101 or P010B
188	T	F	T	T	T	F	F	T	P0101 or P010B
189	T	F	T	T	T	F	T	F	P0101 or P010B
190	T	F	T	T	T	F	T	T	P0101 or P010B
191	T	F	T	T	T	T	F	F	P1101
192	T	F	T	T	T	T	F	T	P1101
193	T	F	T	T	T	T	T	F	P1101
194	T	F	T	T	T	T	T	T	P1101
195	T	T	F	F	F	F	F	F	P1101
196	T	T	F	F	F	F	F	T	P1101
197	T	T	F	F	F	F	T	F	P1101
198	T	T	F	F	F	F	T	T	P0236
199	T	T	F	F	F	T	F	F	P1101
200	T	T	F	F	F	T	F	T	P0121
201	T	T	F	F	F	T	T	F	P1101
202	T	T	F	F	F	T	T	T	P0236
203	T	T	F	F	T	F	F	F	P1101
204	T	T	F	F	T	F	F	T	P1101
205	T	T	F	F	T	F	T	F	P1101
206	T	T	F	F	T	F	T	T	P0236
207	T	T	F	F	T	T	F	F	P1101
208	T	T	F	F	T	T	F	T	P0121
209	T	T	F	F	T	T	T	F	P1101
210	T	T	F	F	T	T	T	T	P0236
211	T	T	F	T	F	F	F	F	P1101
212	T	T	F	T	F	F	F	T	P1101
213	T	T	F	T	F	F	T	F	P1101
214	T	T	F	T	F	F	T	T	P1101
215	T	T	F	T	F	T	F	F	P1101
216	T	T	F	T	F	T	F	T	P1101
217	T	T	F	T	F	T	T	F	P1101
218	T	T	F	T	F	T	T	T	P1101
219	T	T	F	T	T	F	F	F	P1101
220	T	T	F	T	T	F	F	T	P1101
221	T	T	F	T	T	F	T	F	P1101

Initial Supporting table - P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

222	T	T	F	T	T	F	T	T	P1101
223	T	T	F	T	T	T	F	F	P1101
224	T	T	F	T	T	T	F	T	P1101
225	T	T	F	T	T	T	T	F	P1101
226	T	T	F	T	T	T	T	T	P1101
227	T	T	T	F	F	F	F	F	P1101
228	T	T	T	F	F	F	F	T	P1101
229	T	T	T	F	F	F	T	F	P1101
230	T	T	T	F	F	F	T	T	P1101
231	T	T	T	F	F	T	F	F	P1101
232	T	T	T	F	F	T	F	T	P1101
233	T	T	T	F	F	T	T	F	P1101
234	T	T	T	F	F	T	T	T	P1101
235	T	T	T	F	T	F	F	F	P1101
236	T	T	T	F	T	F	F	T	P1101
237	T	T	T	F	T	F	T	F	P1101
238	T	T	T	F	T	F	T	T	P1101
239	T	T	T	F	T	T	F	F	P1101
240	T	T	T	F	T	T	F	T	P1101
241	T	T	T	F	T	T	T	F	P1101
242	T	T	T	F	T	T	T	T	P1101
243	T	T	T	T	F	F	F	F	P1101
244	T	T	T	T	F	F	F	T	P1101
245	T	T	T	T	F	F	T	F	P1101
246	T	T	T	T	F	F	T	T	P1101
247	T	T	T	T	F	T	F	F	P1101
248	T	T	T	T	F	T	F	T	P1101
249	T	T	T	T	F	T	T	F	P1101
250	T	T	T	T	F	T	T	T	P1101
251	T	T	T	T	T	F	F	F	P1101
252	T	T	T	T	T	F	F	T	P1101
253	T	T	T	T	T	F	T	F	P1101
254	T	T	T	T	T	F	T	T	P1101
255	T	T	T	T	T	T	F	F	P1101
256	T	T	T	T	T	T	F	T	P1101
257	T	T	T	T	T	T	T	F	P1101
258	T	T	T	T	T	T	T	T	P1101

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAPI Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	0.840	0.840	0.840	0.840	0.840	0.836	0.934	1.000	0.900	0.900	0.900	0.790	0.790	0.790	0.790	0.790	0.790

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP3 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	0.840	0.840	0.840	0.840	0.840	0.832	0.933	1.000	1.000	0.900	0.900	0.790	0.790	0.790	0.790	0.790	0.790

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P0236_P1101 TIAP Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	0.730	0.730	0.730	0.730	0.720	0.731	0.810	0.841	0.821	0.861	0.900	0.820	0.820	0.820	0.820	0.820	0.820

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max Air Flow

Value Units: Engine Air Flow (Grams/Second)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	25.5	25.4	34.9	38.8	43.6	48.8	51.3	55.1	55.1

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max MAP

Value Units: Manifold Pressure (kPa)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	106.2	106.5	88.5	77.4	70.0	73.3	71.6	66.4	66.4

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Offset

Value Units: Pressure Difference (kPa)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	4.4	4.4	4.9	5.6	6.0	6.6	7.4	8.8	8.8

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min Air Flow

Value Units: Engine Air Flow (Grams/Second)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	21.7	23.0	50.2	67.2	83.5	96.8	107.5	108.2	108.2

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min MAP

Value Units: Manifold Pressure (kPa)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	101.5	102.2	113.0	117.7	123.7	124.3	125.2	120.4	120.4

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Offset

Value Units: Pressure Difference (kPa)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	3.3	3.1	4.1	4.0	4.3	5.3	5.7	10.3	10.3

Initial Supporting table - P050D_P1400_CatalystI_ightOffExtendedEngineRunTimeExit

Description: Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio_EWMA value (y-axis). The NormRatio_EWMA value determines the state of the catalyst. Typically, NormRatio_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R_Pct_FFS_CompAtEngFloat.

y/x	0	25	50	75	100
0.000	35	35	35	35	35
0.125	35	35	35	35	35
0.250	35	35	35	35	35
0.375	35	35	35	35	35
0.500	35	35	35	35	35
0.625	35	35	35	35	35
0.750	35	35	35	35	35
0.875	35	35	35	35	35
1.000	35	35	35	35	35

Initial Supporting table - P1400_CatalystLightOffExtendedEngineRunTimeExit

Description: Exit Catalyst Warm-up mode if Engine Run Time is greater than this value. This table is based on percent ethanol (x-axis) and catmon's NormRatio_EWMA value (y-axis). The NormRatio_EWMA value determines the state of the catalyst. Typically, NormRatio_EWMA values below 0.35 (0 is bad and 1 is good) represent catalysts that have degraded. The emission performance of these degraded catalysts can be improved by extending catalyst light off of GetE85R_Pct_FFS_CompAtEngFloat.

y/x	0	25	50	75	100
0.000	35	35	35	35	35
0.125	35	35	35	35	35
0.250	35	35	35	35	35
0.375	35	35	35	35	35
0.500	35	35	35	35	35
0.625	35	35	35	35	35
0.750	35	35	35	35	35
0.875	35	35	35	35	35
1.000	35	35	35	35	35

Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime

Description: Quality weight-based on engine run time. This allows adjustment of the weighting factors at various engine run times in order to prevent the updating of the cumulative quality timer or to change the value of the average qualified residual energy calculation to prevent false Fails of the diagnostic under circumstances inappropriate to update the calculation of the average qualified residual value.

y/x	0	3	3	4	5	10	15	20	30
1	0	0	1	1	1	1	1	1	1

Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis

Description: This is the x-axis for the KtCSED_K_TimeWght calibration table. Refer to the description for KtCSED_K_TimeWght for details.

y/x	1	2	3	4	5	6	7	8	9
1	0	3	3	4	5	10	15	20	30

Initial Supporting table - P1400_EngineSpeedResidual_Table

Description: This 1x17 table of engine exhaust flow values is used to calculate both the desired and the actual engine exhaust flow based on desired and actual engine speed. The desired engine exhaust flow is gathered from the desired engine speed (VeSPDR_n_EngDsrd). The value used for the actual engine exhaust flow is based on the actual engine RPM value.

y/x	600	700	770	780	800	825	850	875	900	925	1,000	1,149	1,150	1,200	1,400	1,600	2,000
1	1	1	1	4	4	4	4	4	4	4	4	4	16	16	16	16	16

Initial Supporting table - P1400_SparkResidual_Table

Description: Predicted engine-out energy potential based on either the desired cold start spark advance value or the actual spark advance value. ExhEngyPerlInitMass calibration is used to calculate both desired exhaust energy and actual energy. The desired and actual exhaust energy per unit mass values are used in part to calculate the desired exhaust energy per unit time and actual exhaust energy per unit time. Both desired and actual go into the residual exhaust energy per unit time calculation.

y/x	-20	-15	-13	-11	-6	-5	-4	10	20
1	1.50	1.50	1.50	1.50	1.00	0.13	0.06	0.06	0.06

Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est

Description: P0101_P0106_P010B_P0121_P012B_P0236__P1101 MAF1 Residual Weight Factor based on MAF Est

Value Units: Weight Factor (Unitless)
X Unit: Estimated Engine Air Flow (Grams/Second)

y/x	0	15	30	45	60	75	82	85	89	95	100	110	120	150	200	230	250
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)
X Unit: Engine Speed (RPM)

y/x	400	800	1,200	1,600	2,001	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.976	0.940	0.939	0.988	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - CalculatedPerfMaxEd

Description: Maximum desired camshaft position for Exhaust CAM - BankI

Value Units: Maximum desired camshaft position (degCam)
X Unit: Engine Oil Temperature (degC)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[-40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152]

Y Units: Engine Speed (rpm)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200 5600 6000 6400 6800]

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
2	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
3	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
4	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
5	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
6	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
7	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
8	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
9	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
10	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
11	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
12	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
13	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
14	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
15	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
16	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
17	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0

Initial Supporting table - CalculatedPerfMaxIcl

Description: Maximum desired camshaft position for Intake CAM - BankI

Value Units: Maximum desired camshaft position (degCam)
X Unit: Engine Oil Temperature (degC)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[-40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152]
Y Units: Engine Speed (rpm)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200 5600 6000 6400 6800]

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
2	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
3	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
4	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
5	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
6	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
7	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
8	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
9	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
10	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
11	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
12	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
13	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
14	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
15	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
16	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
17	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0

Initial Supporting table - FastFailTempDiff

Description: EOT Sensor Cold Start Fast Fail Threshold

Value Units: Threshold between power-up engine oil temperature and power-up engine coolant temperature (Deg C)
X Unit: PowerUp coolant temperature (deg C)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	80.0	80.0	80.0	60.0	60.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Initial Supporting table - P0196_TotalAccumulatedFlow

Description: Total accumulated air consumed by engine since engine start as a function of powerup undefaulted Oil Temperature

Value Units: Minimum accumulated (total) air grams consumed by engine (gram)
X Unit: PowerUp coolant temperature (deg C)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	15,000	14,000	13,000	12,000	11,000	10,000	9,000	8,000	7,000	6,000	5,000	4,000	5,000	4,000	3,000	3,000	3,000

Initial Supporting table - 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	750	2,300	2,988	2,989	2,990	2,991	2,992	2,993	2,994	2,995	2,996	2,997	2,998	3,998	3,999	4,000
1	0	540	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090	2,090

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_1OmsFlow	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_1OmsFlow	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_1OmsFlow	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 - P060C_Delta MAP Threshold f(Desired Engine Torque)

Description: Engine Sync based and Time based delta pressure threshold above which Torque Security error is reported.

Value Units: Torque Security Threshold for Engine Sync and Time Based Delta Pressure (kPa)
X Unit: Desired Engine Torque (Nm)

y/x	0.00	50.00	100.00	150.00	200.00	300.00
1.00	32.32	32.32	32.32	32.32	32.32	32.32

Initial Supporting table - P060C_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

Value Units: External Load Table for SPDR (Nm)
X Unit: Engine Oil Temperature (deg C)
Y Units: Engine Speed (RPM)

y/x	-40.00	-20.00	-10.00	0.00	50.00	90.00
350.00	148.50	129.83	127.50	135.50	117.00	67.50
450.00	148.50	129.83	127.50	135.50	117.00	67.50
550.00	148.50	129.83	127.50	135.50	117.00	67.50
650.00	148.50	129.83	127.50	135.50	117.00	67.50
750.00	148.50	129.83	127.50	135.50	117.00	67.50
850.00	156.02	136.02	134.44	139.24	120.10	73.51
900.00	160.78	139.12	138.45	139.20	119.73	77.52
1,100.00	170.53	142.20	146.42	137.28	117.27	86.15
1,200.00	183.57	145.29	155.64	139.01	118.29	94.78
1,300.00	191.74	151.15	159.33	149.14	127.97	99.13
1,550.00	192.87	170.65	161.01	163.03	142.17	96.66
1,800.00	118.89	97.37	77.97	70.03	55.60	48.32
2,000.00	90.69	69.86	51.33	44.04	30.72	24.48
2,500.00	69.59	49.11	31.01	24.06	11.29	5.57
4,000.00	-66.00	-66.00	-66.00	-66.00	-66.00	-66.00
6,000.00	-72.60	-72.60	-72.60	-72.60	-72.60	-72.60
6,400.00	-79.20	-79.20	-79.20	-79.20	-79.20	-79.20

Initial Supporting table - Closed Loop Enable Clarification - KaFCLP U SlphrIntglOfst Thrsh

Description: Integral Offset voltage thresholds (bank and cell specific cals) used with KeFCLP_Pct_CatAccuSlphrPostDsbl to check for sulphur poisoning.

Value Units: millivolts
X Unit: Post Catalyst Number

y/x	CiOXYR_O2_PostCat1	CiOXYR_O2_PostCat2
CiFCLP_Decel	2,048	2,048
CiFCLPJdle	2,048	2,048
CiFCLP_Cruise	2,048	2,048
CiFCLP_LightAccel	2,048	2,048
CiFCLP_HeavyAccel	2,048	2,048

Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh

Description: Number of times a post oxygen sensor value must be in range before declaring it ready

Value Units: Time (events * 12.5 milliseconds)

y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents

Description: Number of times a pre oxygen sensor value must be in range before declaring it ready

Value Units: Time (events * 12.5 milliseconds)

y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KeEOSDURichThrsh

Description: The oxygen sensor voltage above which a sensor will be considered failing during a Rich Test.

Value Units: Volts

y/x	1
1	1,050

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_dm_IntegrationAirflowMax

Description: Maximum allowed estimated airflow for post 02 integral terms to be updated.

Value Units: Grams per Second

y/x	1
1	512

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_Pct_CatAccuSlphrPostDsbl

Description: Sulphur percent threshold above which post integral learning is disabled if the threshold criteria KaFCLP_U_SlphrIntglOfst_Thrsh is also met.

Value Units: Percent

y/x	1
1	255

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax

Description: Maximum allowed estimated catalytic converter temperature for post 02 integral terms to be updated.

Value Units: Celcius

y/x	1
1	950

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMin

Description: Minimum allowed estimated catalytic converter temperature to begin using post 02 integration correction terms. Converter temperature must remain above this threshold to ramp-in the post 02 integration adjustments. Once the ramp-in has started, a converter temperature below this threshold will freeze the ramp-in multiplier. Post 02 integration will not be allowed below this converter temperature

Value Units: Celcius

y/x	1
1	450

Initial Supporting table - Closed Loop Enable Clarification - KeFULC T WRAF SensorReadyThrsh

Description: Pumping cell temperature threshold above which the wideband oxygen sensor will be considered ready for use

Value Units: Degrees Celcius

y/x	1
1	650

Initial Supporting table - Closed Loop Enable Clarification - KeWRSC T HtrCntrlCL

Description: WRAF heater temperature enabling threshold for transition from Open Loop to Closed Loop

Value Units: Degrees Celcius

y/x	1
1	628

Initial Supporting table - Closed Loop Enable Clarification - KeWRSI_T_PumpCurrentEnable

Description: WRAF heater temperature threshold for enabling the sensor pump current

Value Units: Degrees Celcius

y/x	1
1	628

Initial Supporting table - Closed Loop Enable Clarification - KfFCLL_T_AdaptiveLoCoolant

Description: LTM learning is inhibited if the engine coolant temperature is below this calibration.

Value Units: Degrees Celcius

y/x	1
1	50

Initial Supporting table - Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo

Description: Voltage limit checked against when determining if a post converter oxygen sensor is in range

Value Units: millivolts

y/x	1
1	1,100

Initial Supporting table - Closed Loop Enable Clarification - KfFULC_U_O2_SensorReadyThrshLo

Description: Voltage limit checked against when determining if a pre converter oxygen sensor is in range

Value Units: millivolts

y/x	1
1	1,100

Initial Supporting table - Closed Loop Enable Clarification - KtFCLL p AdaptiveLowMAP Limit

Description: Long term fuel learning is disabled below this MAP limit as a function of barometric pressure.

Value Units: KPa
X Unit: KPa

y/x	65	70	75	80	85	90	95	100	105
1	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Initial Supporting table - Closed Loop Enable Clarification - KtFCLP t PostIntglDisableTime

Description: Disable integral offset after engine start for this amount of time as a function of start up coolant temperature.

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	409.0	409.0	409.0	409.0	409.0	50.0	50.0	50.0	50.0	50.0	50.0	20.0	20.0	20.0	20.0	20.0	20.0

Initial Supporting table - Closed Loop Enable Clarification - KtFCLPtPostIntglRampInTime

Description: Time required to ramp integral offset to desired value as a function of start up coolant temperature.

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopAutostart

Description: Engine run time following an autostart, as a function of begin run coolant, which must be exceeded to enable CLOSED LOOP.

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
75	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
100	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopTime

Description: Engine run time, as a function of startup coolant temperature, which must be exceeded to enable CLOSED LOOP.

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
0	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	409.0	380.0	300.0	240.0	180.0	25.0	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - P0442 Volatility Time as a Function of Estimate of Ambient Temperature

Description: EONV volatility time as a function of estimated ambient temperature

Value Units: Volatility time (seconds)
X Unit: Estimated Ambient Temperature (Deg C)

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	20	20	20	30	50	80	120	170	210	210	210	210	210	210	210	210	210

Initial Supporting table - P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature

Description: Maximum engine off time before vehicle off time as a function of estimated ambient temperature (EAT)

Value Units: Maximum Engine Off Time Before Vehicle Off Time (seconds)
X Unit: Estimated Ambient Temperature (Deg C)

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Initial Supporting table - P0442 EON)V Pressure Threshold (Pascals)

Description: EONV pressure threshold as a function of fuel level and estimated ambient temperature (EAT)

Value Units: EONV Pressure Threshold (Pascals)
X Unit: Fuel Level (percent) from 0 to 100 with step size 6.25
Y Units: Estimated Ambient Temperature (deg C) from -10 to 80 with step size 5.625

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
2	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
3	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
4	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
5	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
6	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
7	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
8	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
9	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
10	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
11	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
12	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
13	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
14	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
15	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
16	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5
17	-423.5	-423.5	-386.0	-361.2	-336.2	-311.4	-286.5	-261.5	-236.7	-211.6	-186.8	-162.0	-137.0	-124.5	-124.5	-124.5	-124.5

Initial Supporting table - P0068_Delta MAF Threshold f(TPS)

Description: Table of delta MAF values as a function of desired throttle position. The output of this table provides a delta MAF that if the measured minus the estimated MAF exceeds, is considered a fail.

Value Units: Delta MAF Values (dm)
X Unit: Desired Throttle Position (Pct)

y/x	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	100.00
1.00	14.70	20.66	25.20	48.42	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Delta MAP Threshold f(TPS)

Description: Table of delta MAP values as a function of desired throttle position. The output of this table provides a delta MAP that if the measured minus the estimated MAP exceeds, is considered a fail.

Value Units: Delta MAP Values (kPa)
X Unit: Desired Throttle Position (Pct)

y/x	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	100.00
1.00	33.29	36.01	32.32	35.95	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Maximum MAF f(RPM)

Description: Table of maximum MAF values vs. engine speed. This is the maximum MAF the engine can see under all ambient conditions.

Value Units: Delta MAF Values (dm)
X Unit: Engine Speed (RPM)

y/x	600.00	1,400.00	2,200.00	3,000.00	3,800.00	4,600.00	5,400.00	6,200.00	7,000.00
1.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

Initial Supporting table - P0068_Maximum MAF f(Volts)

Description: Table of maximum MAF values vs. system voltage. The output of the air meter is clamped to lower values as system voltage drops off.

Value Units: Delta MAF Values (dm)
X Unit: System Voltage (V)

y/x	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
1.00	511.99	511.99	511.99	511.99	511.99	511.99	511.99	511.99	511.99

Initial Supporting table - P0326_P0331_AbnormalNoise_Thresh_AFM

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine IS in AFM mode

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.413	0.413	0.413	0.413	0.413	0.361	0.299	0.222	0.180	0.144	0.122	0.114	0.114	0.114	0.114	0.114	0.114

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 - P16A7 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 - 1st_FireAftrMisfr_Acel

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.81	2.04	1.21	1.89	0.85	0.74	0.68	1.08	1.10	0.94	0.85	0.80	0.71	0.82	0.70	0.50	0.50
8	1.35	1.70	1.13	2.06	1.12	0.81	0.75	0.91	0.98	0.86	0.94	0.80	0.78	0.94	0.75	0.50	0.55
12	0.84	1.07	0.99	1.90	0.84	0.77	0.58	0.72	0.91	0.83	0.80	0.80	0.69	0.76	0.69	0.53	0.45
16	0.38	0.52	0.79	1.38	0.69	0.63	0.43	0.48	0.70	0.62	0.61	0.59	0.53	0.52	0.50	0.47	0.42
20	0.09	0.20	0.63	1.07	0.60	0.54	0.34	0.33	0.53	0.49	0.50	0.43	0.38	0.39	0.36	0.33	0.27
24	-0.05	-0.02	0.48	0.87	0.54	0.48	0.27	0.24	0.43	0.41	0.43	0.33	0.29	0.30	0.26	0.27	0.22
30	-0.31	-0.23	0.34	0.67	0.48	0.42	0.20	0.14	0.33	0.33	0.36	0.25	0.22	0.20	0.18	0.19	0.13
40	-0.51	-0.45	0.22	0.47	0.41	0.36	0.13	0.04	0.23	0.25	0.29	0.17	0.15	0.13	0.08	0.08	0.03
60	-0.73	-0.66	0.10	0.26	0.35	0.29	0.06	-0.05	0.13	0.17	0.22	0.09	0.07	0.04	-0.01	-0.02	-0.04

Initial Supporting table - 1st_FireAftrMisfr_Jerk

Description: Used for P0300 - P0308, Multiplier for establishing the expected Jerk of the cylinder after the misfire

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	-0.84	-0.83	-0.90	-0.82	-0.93	-0.79	-0.92	-0.70	-0.74	-0.77	-0.70	-0.69	-0.69
12	-0.15	-0.16	0.00	-0.40	-1.19	-1.10	-1.20	-1.05	-1.15	-1.00	-1.27	-1.26	-1.22	-1.14	-1.20	-1.00	-1.08
16	-0.38	-0.40	-0.04	-0.79	-1.18	-1.17	-1.18	-1.07	-1.12	-1.00	-1.19	-1.25	-1.33	-1.19	-1.31	-1.09	-1.25
20	-0.52	-0.55	-0.32	-0.95	-1.18	-1.20	-1.16	-1.09	-1.10	-1.00	-1.15	-1.28	-1.32	-1.24	-1.34	-1.22	-1.25
24	-0.62	-0.64	-0.48	-1.04	-1.18	-1.22	-1.16	-1.10	-1.09	-1.00	-1.13	-1.26	-1.37	-1.30	-1.36	-1.25	-1.39
30	-0.72	-0.74	-0.64	-1.12	-1.18	-1.24	-1.15	-1.10	-1.08	-1.00	-1.10	-1.24	-1.38	-1.32	-1.39	-1.33	-1.45
40	-0.82	-0.83	-0.78	-1.20	-1.18	-1.26	-1.14	-1.11	-1.08	-1.00	-1.07	-1.22	-1.35	-1.32	-1.38	-1.35	-1.44
60	-0.92	-0.93	-0.91	-1.27	-1.17	-1.29	-1.13	-1.12	-1.06	-1.00	-1.04	-1.20	-1.32	-1.30	-1.35	-1.36	-1.49

Initial Supporting table - IstFireAfterMisJerkAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected jerk of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1

Initial Supporting table - IstFireAftrMisAcelAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
24	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

Initial Supporting table - Abnormal Cyl Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	4	3	3	2	2	2	2	2	2

Initial Supporting table - Abnormal Rev Mode

Description: Used for P0300-P0308. Abnormal Rev Mode Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Rev Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	4.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00

Initial Supporting table - Abnormal SCD Mode

Description: Used for P0300-P0308. Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (SCD Mode Equation)

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	4	3	3	2	2	2	2	2	2

Initial Supporting table ■Bank_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
8	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
12	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
16	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
20	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

Initial Supporting table - Bank_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - BankCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Lores Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
8	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
12	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
16	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
20	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
24	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
30	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
40	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
60	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Initial Supporting table ■BankCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
8	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
12	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
16	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
20	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
24	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
30	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
40	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
60	1.00	1.00	1.00	1.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Initial Supporting table - Catalyst_Damage_Misfire_Percentage

Description: Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

Value Units: percent misfire over 200 revolutions (%)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	33.0	33.0	25.0	20.0	16.0	12.0	12.0	12.0
10	33.0	33.0	25.0	20.0	16.0	12.0	12.0	12.0
20	33.0	25.0	20.0	16.0	13.0	11.0	11.0	11.0
30	25.0	20.0	16.0	14.0	11.0	9.0	9.0	9.0
40	20.0	15.0	8.0	8.0	8.0	7.0	7.0	7.0
50	15.0	10.0	7.0	7.0	7.0	4.6	4.6	4.6
60	12.0	7.0	4.6	4.6	4.6	4.6	4.6	4.6
70	10.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6
80	9.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6
90	7.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6
100	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

Initial Supporting table - ClyAfterAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylyBeforeAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CombustModeIdleTbl

Description: Used for P0300 - P0308, Only used on Diesel engines. Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of different combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

CombustModeIdleTbl - Part 1

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

CombustModeIdleTbl - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - (ConsecCylModDecel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.27	1.29	0.94	0.90	1.12	1.56	0.61	0.65	0.82	0.65	0.75	0.84	0.77	0.77	0.65	0.56	0.64
8	1.18	1.25	0.98	0.88	0.66	1.36	0.67	0.60	0.82	0.67	0.77	0.91	0.89	1.00	0.69	0.63	0.82
12	1.31	1.15	0.87	0.79	0.48	0.72	0.63	0.50	0.73	0.69	0.62	0.95	0.93	0.86	0.81	0.73	0.91
16	1.42	0.97	0.67	0.68	0.51	0.53	0.55	0.41	0.56	0.58	0.45	0.76	0.82	0.72	0.85	0.87	0.92
20	1.51	0.96	0.64	0.71	0.59	0.55	0.52	0.46	0.46	0.48	0.48	0.61	0.78	0.78	0.88	0.94	0.87
24	1.59	1.09	0.86	0.78	0.69	0.65	0.57	0.52	0.46	0.43	0.49	0.51	0.77	0.81	0.90	0.95	0.89
30	1.71	1.32	1.12	0.97	0.78	0.75	0.66	0.58	0.54	0.55	0.50	0.53	0.77	0.85	0.92	1.00	0.91
40	1.87	1.59	1.40	1.16	0.88	0.85	0.75	0.65	0.62	0.66	0.63	0.63	0.78	0.88	0.94	1.03	0.94
60	2.08	1.88	1.68	1.34	0.98	0.95	0.84	0.72	0.69	0.76	0.75	0.72	0.78	0.91	0.95	1.07	0.94

Initial Supporting table - ConsecCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0
8	0	-1	-2	-2	-2	-1	-2	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1
12	-1	-1	-2	-2	-3	-1	-1	-1	-2	-2	-2	-1	-1	-1	-1	-1	-1
16	0	-1	-2	-2	-3	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1
20	0	-1	-2	-2	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1
24	0	-1	-1	-1	-2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1
30	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
40	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
60	1	1	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0

Initial Supporting table - ConsecSCD_Decel

Description: Used for P0300 - P0308, Mulitplier to medres decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table ■ConsecSCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylAfterAFM Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1

Initial Supporting table - C2ylBeforeAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylModeDecel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

CylModeDecel - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	6,475	4,571	2,783	1,801	1,293	983	734	587	471	351	290	249	146
6	6,938	5,082	3,004	1,886	1,327	892	701	529	433	354	252	236	126
8	7,231	5,375	3,197	1,950	1,347	886	704	520	426	356	258	229	126
10	7,524	5,667	3,357	2,005	1,366	974	746	566	444	358	302	231	153
12	7,817	5,959	3,516	2,133	1,481	1,114	797	617	504	392	339	243	181
14	8,110	6,251	3,675	2,250	1,623	1,243	916	721	575	430	376	284	209
16	8,403	6,544	3,835	2,408	1,766	1,372	1,035	824	646	468	418	325	237
18	8,696	6,836	3,994	2,567	1,909	1,501	1,154	928	717	505	461	366	265
20	8,988	7,128	4,153	2,725	2,051	1,629	1,273	1,032	797	562	516	407	293
22	9,281	7,421	4,313	2,883	2,194	1,758	1,392	1,136	884	633	570	448	321
24	9,574	7,713	4,472	3,042	2,336	1,887	1,511	1,240	972	704	624	489	349
26	9,867	8,005	4,631	3,200	2,479	2,016	1,630	1,344	1,059	774	679	530	377
30	10,453	8,590	4,950	3,517	2,764	2,273	1,869	1,552	1,234	916	787	613	433
40	11,917	10,052	5,746	4,309	3,476	2,917	2,464	2,071	1,670	1,269	1,059	818	573
60	14,845	12,975	7,340	5,893	4,902	4,205	3,655	3,110	2,543	1,977	1,602	1,229	853
78	17,408	15,532	8,734	7,280	6,149	5,331	4,698	4,020	3,307	2,595	2,078	1,588	1,097
97	19,970	18,090	10,128	8,625	7,396	6,458	5,740	4,929	4,071	3,214	2,566	1,948	1,342

CylModeDecel - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
3	117	85	66	50	40	34	23	16	11	10	9	7	6
6	117	90	68	53	43	33	23	14	9	9	9	6	5
8	118	97	69	55	44	33	22	14	9	8	8	6	5
10	118	104	70	56	45	33	22	14	9	8	8	6	5
12	132	121	78	58	47	40	22	15	11	8	8	6	5
14	151	137	91	64	55	46	25	17	13	9	7	6	5
16	170	153	105	74	63	53	29	19	15	10	8	6	5
18	190	170	118	84	72	60	34	22	16	12	9	7	6
20	209	186	131	95	80	67	39	25	18	13	9	8	7
22	228	202	144	105	88	74	44	28	20	14	10	9	7
24	248	219	157	115	96	81	48	31	22	16	11	9	8

Initial Supporting table - CylModeDecel

26	267	235	170	126	104	88	53	34	24	17	12	10	9
30	306	268	197	147	121	102	63	40	27	20	14	12	11
40	402	349	263	198	161	137	86	54	36	27	19	16	14
60	596	513	394	302	243	206	134	83	55	41	28	24	22
78	765	656	510	393	315	267	175	108	70	53	35	31	28
97	934	799	625	484	386	328	216	133	86	65	43	39	35

Initial Supporting table - CylModeJerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
Y Units: percent load of max indicated torque (%)

CylModeJerk - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	7,159	4,163	2,943	1,762	1,183	834	683	505	418	300	256	230	152
6	7,940	5,053	3,472	2,224	1,528	1,027	734	537	457	329	256	240	151
8	8,386	5,557	3,774	2,488	1,725	1,137	832	607	494	365	292	246	158
10	8,832	6,060	4,077	2,752	1,922	1,247	964	693	561	429	335	252	168
12	9,278	6,564	4,475	3,016	2,119	1,384	1,141	833	663	494	389	268	192
14	9,725	7,067	4,824	3,283	2,285	1,610	1,318	973	766	558	448	289	231
16	10,171	7,571	5,257	3,646	2,568	1,837	1,495	1,114	873	632	525	349	270
18	10,617	8,074	5,691	4,009	2,851	2,063	1,672	1,254	982	711	602	409	308
20	11,064	8,578	6,124	4,371	3,133	2,289	1,849	1,394	1,103	811	679	470	347
22	11,510	9,082	6,558	4,734	3,416	2,515	2,026	1,535	1,223	912	756	530	386
24	11,956	9,585	6,992	5,097	3,699	2,741	2,203	1,675	1,344	1,013	832	590	425
26	12,403	10,089	7,425	5,460	3,982	2,968	2,379	1,815	1,465	1,114	909	650	463
30	13,295	11,096	8,292	6,185	4,548	3,420	2,733	2,096	1,706	1,316	1,063	771	541
40	15,527	13,614	10,461	7,999	5,962	4,551	3,618	2,797	2,309	1,821	1,447	1,072	735
60	20,000	18,563	14,797	11,626	8,791	6,812	5,387	4,200	3,515	2,830	2,215	1,674	1,126
78	20,000	20,000	18,591	14,800	11,267	8,791	6,934	5,428	4,570	3,713	2,886	2,202	1,475
97	20,000	20,000	20,000	17,973	13,742	10,770	8,482	6,655	5,625	4,596	3,558	2,729	1,824

CylModeJerk - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
3	108	80	69	50	40	35	25	20	15	13	9	7	6
6	107	79	60	50	39	36	25	18	13	10	8	7	6
8	106	84	62	51	43	36	25	18	13	10	8	7	6
10	121	93	70	57	49	36	25	18	13	10	8	7	6
12	149	106	85	68	58	42	25	18	14	10	9	7	6
14	177	125	100	79	67	49	31	20	16	11	10	7	7
16	205	144	115	90	76	57	36	23	19	13	12	8	8
18	232	164	129	101	85	64	41	26	21	15	13	9	8
20	260	183	144	112	94	71	46	30	23	16	14	10	9
22	288	202	159	122	103	79	51	33	25	18	15	11	10
24	316	221	174	133	112	86	56	36	27	20	16	12	11

Initial Supporting table - CylModeJerk

26	344	240	189	144	121	93	61	39	30	21	18	13	12
30	399	278	218	166	139	108	72	46	34	25	20	15	13
40	538	373	292	220	183	145	97	62	45	33	26	20	17
60	816	564	440	329	273	218	149	94	68	50	38	29	25
78	1,059	731	570	425	352	282	194	122	87	64	49	37	32
97	1,302	898	699	520	430	346	239	150	107	79	59	46	39

Initial Supporting table - DeacCylInversionDecel

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't decelerate at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
8	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
12	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
16	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
20	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
24	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
30	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
40	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
60	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384

Initial Supporting table - DeacCylInversionJerk

Description: Used for P0300 - P0308, Negative Torque can cause crank readings to invert (active cylinders appear weak & deactivated cylinders appear "strong" If deactivated cylinders don't jerk at least this amount then the crank signal is inverting. Function of speed and load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
8	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
12	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
16	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
20	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
24	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
30	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
40	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
60	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

Value Units: RPM
X Unit: Enumeration of transmission gear state (enumeration)

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	6,200	6,200	6,200	6,200	6,200	6,200	6,200

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGrl0	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_T ransGr7	CeTGRR_e_TransGr8	
1	6,200	4,000	4,000	4,000	6,200	6,200	

Initial Supporting table - InfrequentRegen

Description: Used for P0300-P0308. Only used on Diesel engines. Initiates a misfire delay when the current combustion mode matchs a selection in the table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of different combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

InfrequentRegen - Part 1

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

InfrequentRegen - Part 2

y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

InfrequentRegen - Part 3

y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - Number of Normals

Description: Used for P0300-P0308. Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM   (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	2	2	2	2	2	2	2	2	2

Initial Supporting table - P00C6 - High Pressure Pump Control Mode timeout

Description: High Pressure Pump Control Mode timeout

Value Units: Time (Seconds)
X Unit: Coolant Temperature (Deg C)

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	11.0	11.0	10.0	9.0	8.0	5.0	5.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

jp jorting table - P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure St;

Description: The maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start (HPS) is executed but before engine is in run mode.

Value Units: maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start (Count)
X Unit: Coolant Temperature (Deg C)
Y Units: Ethanol Precent (%)

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
13	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
38	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
63	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
88	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start

Description: The minimum acceptable value of fuel rail pressure after High Pressure Start (HPS) is executed. This ensures the pressure does not fall off drastically after High Pressure Start (HPS) is executed, but before engine is in run mode.

Value Units: Minimum acceptable value of fuel rail pressure after High Pressure Start (Mpa)
X Unit: Coolant Temperature (Deg C)
Y Units: Ethanol Precent (%)

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
13	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
25	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
38	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
50	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
63	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
75	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
88	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100	2.0	2.0	2.0	2.0	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Initial Supporting table - P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

Description: This calibration is the minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery

Value Units: Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery
X Unit: Coolant Temperature (Deg C)
Y Units: Ethanol Precent (%)

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
13	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
25	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
38	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
50	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
63	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
75	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
88	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
100	20.0	15.0	14.0	12.0	10.0	8.0	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5

Initial Supporting table - Pair_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
8	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
12	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
16	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
20	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

Initial Supporting tablej - Pair_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - PairCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	0.93	0.87	0.87	0.60	0.52	0.56	0.59	0.60	0.56	0.59	0.67	0.55	0.68	0.60	0.56	0.64
8	1.09	0.88	0.85	0.64	0.65	0.67	0.51	0.52	0.58	0.56	0.60	0.48	0.48	0.71	0.50	0.50	0.73
12	1.05	1.04	0.98	0.83	0.79	0.73	0.67	0.57	0.62	0.61	0.59	0.66	0.66	0.71	0.63	0.53	0.73
16	1.10	1.10	0.96	1.06	0.81	0.84	0.81	0.66	0.67	0.71	0.58	0.76	0.76	0.69	0.75	0.80	0.75
20	1.16	1.14	1.04	1.19	0.86	0.90	0.89	0.73	0.73	0.77	0.66	0.77	0.78	0.75	0.80	0.89	0.80
24	1.20	1.17	1.09	1.19	0.91	0.95	0.95	0.77	0.78	0.80	0.72	0.77	0.81	0.77	0.81	0.91	0.83
30	1.24	1.20	1.15	1.19	0.96	0.99	1.01	0.82	0.82	0.84	0.78	0.78	0.82	0.78	0.85	0.93	0.87
40	1.29	1.24	1.20	1.20	1.01	1.04	1.08	0.87	0.86	0.87	0.83	0.78	0.84	0.81	0.89	0.95	0.94
60	1.33	1.28	1.26	1.20	1.06	1.09	1.14	0.93	0.91	0.91	0.89	0.79	0.86	0.82	0.91	0.98	0.94

Initial Supporting table - PairCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.55	1.56	1.57	1.61	1.31	1.00	1.00	1.10	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.24	1.14	1.28	1.33	1.14	1.06	1.19	1.23	1.19	1.17	1.08	1.00	1.00	1.00	1.00	1.00	1.00
12	1.31	1.37	1.23	1.39	1.46	1.40	1.31	1.33	1.28	1.21	1.31	1.02	1.19	1.04	1.05	1.00	1.08
16	1.40	1.51	1.14	1.62	1.76	1.56	1.33	1.34	1.28	1.16	1.36	1.15	1.30	1.14	1.15	1.00	1.06
20	1.45	1.56	1.30	1.68	1.79	1.65	1.43	1.44	1.38	1.25	1.43	1.23	1.36	1.22	1.25	1.15	1.15
24	1.54	1.58	1.44	1.68	1.80	1.71	1.50	1.51	1.44	1.34	1.47	1.29	1.39	1.26	1.26	1.22	1.30
30	1.54	1.61	1.57	1.68	1.82	1.76	1.56	1.57	1.49	1.42	1.51	1.34	1.42	1.29	1.31	1.25	1.38
40	1.54	1.65	1.71	1.68	1.83	1.81	1.63	1.64	1.55	1.51	1.55	1.38	1.45	1.34	1.34	1.35	1.44
60	1.54	1.68	1.85	1.68	1.84	1.86	1.69	1.70	1.61	1.59	1.59	1.43	1.48	1.39	1.36	1.42	1.56

Initial Supporting table - Random_SCD_Decel

Description: Used for P0300 - P0308, Mulitplier to SCD_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Random_SCD_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	550	700	800	900	1,000	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Decl

Description: Used for P0300 - P0308, Mulitplierto CylinderJDecel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Jerk

Description: Used for P0300 - P0308, Mulitplierto Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	900	1,000	1,100	1,200	1,400	1,600	2,000	2,400	2,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomCylModDecel

Description: Used for P0300 - P0308. Multiplier to CylMode_Decel. account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: Multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	1.00	1.00	1.30	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.21	1.42	1.20	1.30	1.25	1.47	1.06	1.07	1.09	1.17	1.40	1.09	1.22	1.47	1.19	1.00	1.09
12	1.47	1.83	1.40	1.40	1.40	1.40	1.40	1.18	1.45	1.61	1.58	1.70	1.72	1.62	1.69	1.33	1.36
16	1.71	2.07	1.60	1.50	1.50	1.46	1.49	1.26	1.50	1.65	1.57	1.81	1.74	1.48	1.80	1.80	1.75
20	1.91	2.26	1.70	1.70	1.61	1.53	1.54	1.33	1.54	1.62	1.60	1.74	1.66	1.56	1.80	1.83	1.73
24	2.08	2.41	1.73	1.55	1.60	1.57	1.58	1.38	1.55	1.66	1.62	1.71	1.71	1.63	1.77	1.86	1.78
30	2.30	2.57	1.84	1.58	1.60	1.62	1.62	1.42	1.58	1.69	1.63	1.67	1.76	1.72	1.82	1.96	1.83
40	2.59	2.76	1.96	1.61	1.59	1.66	1.66	1.48	1.60	1.73	1.66	1.65	1.79	1.79	1.85	1.97	1.94
60	2.97	2.96	2.08	1.64	1.59	1.71	1.70	1.53	1.62	1.76	1.67	1.63	1.83	1.86	1.86	2.05	1.98

Initial Supporting table - RandomCylModJerk

Description: Used for P0300 - P0308, Multiplier to CylMode_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	700	900	1,100	1,400	1,600	1,800	2,000	2,200	2,400	2,600	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - FandomRevModDecl

Description: Used for P0300 - P0308, Mulitplier to RevMode_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	3,000	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

Description: Used for P0300 - P0308, If misfire is present in consecutive engine cycles, this multiplier is applied to the misfire jerk threshold and compared to a crankshaft snap value after the misfire has taken place.. Table lookup as a function of engine rpm.

Value Units: multiplier
X Unit: RPM

y/x	1,000	1,400	1,800	2,200	2,600	3,000	4,000	5,000	6,000
1	1.00	1.00	1.00	1.11	1.11	1.25	1.25	1.25	1.25

Initial Supporting table - RevMode_Decel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time between revolutions (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - Ring Filter

Description: Used for P0300-P0308. Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	4	4	4	4	4	4	4	4	4

Initial Supporting table - SCD_Decel

Description: Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - SCD_Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Change in Delta time per cylinder from last cylinder (usee)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
97	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

Initial Supporting table - SnapDecayAfterMisfire

Description: Used for P0300 - P0308, multiplier times the ddtjerk value used used to detect misfire at that speed and load to see if size of disturbance has died down as expected of real misfire. Table lookup as a function of engine rpm and trans gear ratio.

Value Units: multiplier
X Unit: RPM
Y Units: gear ratio

y/x	1,000	1,400	1,800	2,200	2,600	3,000	4,000	5,000	6,000
1	1.10	1.00	1.00	0.90	0.90	0.80	0.80	0.80	0.80
1	1.10	1.00	1.00	1.00	0.90	0.90	0.80	0.80	0.80
1	1.10	1.00	1.00	1.00	1.00	0.90	0.90	0.80	0.80
1	1.10	1.10	1.00	1.00	1.00	1.00	0.90	0.90	0.80
2	1.10	1.10	1.10	1.10	1.00	1.00	1.00	0.90	0.90
2	1.10	1.10	1.30	1.20	1.20	1.10	1.00	1.00	0.90
3	1.20	1.20	1.40	1.30	1.30	1.10	1.00	1.00	1.00
3	1.40	1.40	2.20	1.30	1.20	1.10	1.00	1.00	1.00
5	1.40	1.40	1.60	1.20	1.10	1.00	1.00	1.00	1.00

Initial Supporting table - TOSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Rough Road source = TOSS: dispersion value on Transmission Output Speed Sensor above which rough road is indicated present

Value Units: change in rpm per sec (rpm)
X Unit: Engine Speed (RPM)
Y Units: Transmission Speed (RPM)

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
500	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
600	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
700	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
800	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
900	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,000	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Initial Supporting table - WaitToStart

Description: Used for P0300-P0308. Number of engine cycles to delay if diesel engine is cranked before wait to start lamp is extinguished. This lookup table determines the delay length by taking into account the coolant temperature.

Value Units: Number of Engine Cycles (integer)
X Unit: Engine Coolant (deg C)

y/x	-20	-10	0	10	20	30	40	50	60
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - WSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

Value Units: acceleration
X Unit: Vehicle Speed (KPH)

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	0.55005	0.57996	0.60999	0.69995	0.90002	1.09998	1.34998	1.34998	0.79004	0.80005	0.80005	0.80005	0.80005	0.80005	0.80005	0.80005	0.80005

Initial Supporting table - ZeroTorqueAFM

Description: Used for P0300-P0308. Zero torque engine load while in Active Fuel Management. %of Max Brake Torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueAFM - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
65	-1.07	-1.14	-1.29	-1.57	-1.75	-1.85	-1.70	-1.45	-1.30	-1.07	-0.71	-0.34	0.15
75	-0.82	-0.89	-1.04	-1.32	-1.50	-1.60	-1.45	-1.25	-1.23	-0.98	-0.41	0.06	0.76
85	-0.81	-0.89	-1.03	-1.31	-1.50	-1.59	-1.25	-1.15	-0.95	-0.58	-0.31	0.06	0.76
95	-0.80	-0.87	-1.02	-1.30	-1.48	-1.58	-1.25	-1.15	-0.95	-0.58	-0.31	0.06	0.76
105	-0.79	-0.87	-1.01	-1.29	-1.48	-1.57	-1.25	-1.15	-0.95	-0.58	-0.31	0.06	0.76

ZeroTorqueAFM - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
65	0.70	0.68	0.67	0.97	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
75	0.70	0.68	0.67	0.97	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
85	0.70	0.68	0.67	0.97	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
95	0.70	0.68	0.67	0.97	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
105	0.70	0.68	0.67	0.97	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44

Initial Supporting table - ZeroTorqueEngLoad

Description: Used for P0300-P0308. %of Max Brake Torque that represents Zero Brake torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueEngLoad - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
65	-3.37	-3.44	-3.59	-3.70	-3.70	-3.70	-3.70	-3.49	-3.16	-2.76	-2.36	-1.96	-1.25
75	-3.37	-3.44	-3.59	-3.70	-3.70	-3.70	-3.70	-3.49	-3.16	-2.76	-2.36	-1.96	-1.25
85	-3.37	-3.44	-3.59	-3.70	-3.70	-3.70	-3.70	-3.49	-3.16	-2.76	-2.36	-1.96	-1.25
95	-3.37	-3.44	-3.59	-3.70	-3.70	-3.70	-3.70	-3.49	-3.16	-2.76	-2.36	-1.96	-1.25
105	-3.37	-3.44	-3.59	-3.70	-3.70	-3.70	-3.70	-3.49	-3.16	-2.76	-2.36	-1.96	-1.25

ZeroTorqueEngLoad - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
65	-0.80	-0.50	-0.30	0.00	0.35	0.70	1.75	2.80	3.85	4.90	5.95	7.00	8.05
75	-0.80	-0.50	-0.30	0.10	0.45	0.80	1.86	2.93	3.99	5.06	6.12	7.19	8.25
85	-0.80	-0.50	-0.27	0.03	0.60	1.10	2.15	3.20	4.25	5.30	6.35	7.40	8.45
95	-0.70	-0.35	0.00	0.43	0.88	1.30	2.35	3.40	4.45	5.50	6.55	7.60	8.65
105	-0.50	0.00	0.23	0.73	1.10	1.50	2.55	3.60	4.65	5.70	6.75	7.80	8.85

Initial Supporting table - Minimum Non-Purge Samples for Purge Vapor Fuel

Description: Number of Fuel Trim Monitor sample counts required to allow the Purge Vapor Fuel value to inhibit the Intrusive Rich test

Value Units: Sample Counts per loop rate of 100ms (divide by 10 to get seconds)
X Unit: Long Term Fuel Trim Cell I.D. (no units) (Only PurgeOff cells are used)

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 1

y/x	CeFADR_e_CellOO_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
1	65,535	65,535	65,535	65,535

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 2

y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	65,535	65,535	65,535	65,535

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 3

y/x	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell 10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
1	250	65,535	65,535	65,535

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 4

y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell1 5_PurgOffDecel
1	65,535	65,535	100	100

Initial Supporting table - P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage

Description: Identifies which Long Term Fuel Trim Cell I.D.s are used for diagnosis. Only cells identified as "CeFADD_e_NonSelectedCeH" are not used for diagnosis.

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 1

y/x	CeFADR_e_CellOO_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR e Cell02 PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_8electedPurgeCell	CeFADD_e_SelectedPurgeCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2

y/x	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR e Cell05 PurgOnAirMode0	CeFADR_e_Cell06_PurgOnldle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3

y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR e Cell10 PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 4

y/x	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR e Cell13 PurgOffAirMode0	CeFADR_e_Cell14_PurgOffldle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell

Initial Supporting table - Startup Engine Coolant adjusment to Minimum accumulation time

Description: Time offset added to the minimum accumulation time based on Startup Coolant.

Value Units: Counts (10 counts equals 1 second)
X Unit: Degree C

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	194	194	152	110	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P2B85 26CE Pump Speed Performance Initialization Delay

Description: Pump speed performance initialization delay as function of command speed and engine inlet coolant temperature

Value Units: Pump initialization delay (s)
X Unit: Engine inlet coolant temperature (Deg C)
Y Units: Commanded pump speed (RPM)

y/x	-40	0	40
1,000	5	5	5
4,000	5	5	5
6,000	5	5	5

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:

y/x	0.000	0.001	0.011	0.025	0.038	0.048	0.077	0.200	1.000
1	0	0	0	0	1	1	1	1	1

Initial Supporting table - P057B KtBRKl K FastTestPointWeight

Description:

y/x	0.000	0.001	0.011	0.025	0.038	0.048	0.077	0.200	1.000
1	0	0	0	0	1	1	1	1	1

Initial Supporting table - DFCO CoolEnblHi Temp

Description:

y/x	-40	0	25
1	30.0	25.0	20.0

Initial Supporting table - DFCO DriverRequestZeroPedalTrq DsblOf

Description:

DFCO_DriverRequestZeroPedalTrq_DsblOf - Part 1

y/x	CeDTRR_e_TrqShapingRateA	CeDTRR_e_TrqShapingRateB	CeDTRR_e_TrqShapingRateC	CeDTRR_e_TrqShapingRateD	CeDTRR_e_TrqShapingRateE
CeTCOR_e_Exh_Normal	15	15	15	15	15
CeTCOR_e_Exh_Sport	15	15	15	15	15
CeTCOR_e_Exh_Track	15	15	15	15	15

DFCO_DriverRequestZeroPedalTrq_DsblOf - Part 2

y/x	CeDTRR_e_TrqShapingRateF	CeDTRR_e_TrqShapingRateG	CeDTRR_e_TrqShapingRateH	CeDTRR_e_TrqShapingRateI	CeDTRR_e_TrqShapingRateJ
CeTCOR_e_Exh_Normal	15	15	15	15	15
CeTCOR_e_Exh_Sport	15	15	15	15	15
CeTCOR_e_Exh_Track	15	15	15	15	15

Initial Supporting table - DFCO DriverRequestZeroPedalTrq EnblOf

Description:

DFCO_DriverRequestZeroPedalTrq_EnblOf - Part 1

y/x	CeDTRR_e_TrqShapingRateA	CeDTRR_e_TrqShapingRateB	CeDTRR_e_TrqShapingRateC	CeDTRR_e_TrqShapingRateD	CeDTRR_e_TrqShapingRateE
CeTCOR_e_Exh_Normal	10	10	10	10	10
CeTCOR_e_Exh_Sport	10	10	10	10	10
CeTCOR_e_Exh_Track	10	10	10	10	10

DFCO_DriverRequestZeroPedalTrq_EnblOf - Part 2

y/x	CeDTRR_e_TrqShapingRateF	CeDTRR_e_TrqShapingRateG	CeDTRR_e_TrqShapingRateH	CeDTRR_e_TrqShapingRateI	CeDTRR_e_TrqShapingRateJ
CeTCOR_e_Exh_Normal	10	10	10	10	10
CeTCOR_e_Exh_Sport	10	10	10	10	10
CeTCOR_e_Exh_Track	10	10	10	10	10

Initial Supporting table - DFCO_DsblLo_Vehicle_Speed

Description:

y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	23	23
CeTGRR_e_TransGr2	21	21
CeTGRR_e_TransGr3	18	18
CeTGRR_e_TransGr4	17	17
CeTGRR_e_TransGr5	0	0
CeTGRR_e_TransGr6	0	0
CeTGRR_e_TransGr9	0	0
CeTGRR_e_TransGr10	0	0
CeTGRR_e_TransGrNeut	0	0
CeTGRR_e_TransGrRvrs	0	0
CeTGRR_e_TransGrPark	0	0
CeTGRR_e_TransGr7	0	0
CeTGRR_e_TransGr8	0	0

Initial Supporting table - DFCO EnblHi Vehicle Speed

Description:

y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	32.0	32.0
CeTGRR_e_TransGr2	24.0	24.0
CeTGRR_e_TransGr3	23.0	23.0
CeTGRR_e_TransGr4	23.0	23.0
CeTGRR_e_TransGr5	0.0	0.0
CeTGRR_e_TransGr6	0.0	0.0
CeTGRR_e_TransGr9	0.0	0.0
CeTGRR_e_TransGr10	0.0	0.0
CeTGRR_e_TransGrNeut	0.0	0.0
CeTGRR_e_TransGrRvrs	512.0	512.0
CeTGRR_e_TransGrPark	0.0	0.0
CeTGRR_e_TransGr7	0.0	0.0
CeTGRR_e_TransGr8	0.0	0.0

Initial Supporting table - DFCO EngSpdEnblOfst

Description:

y/x	-1,750	-1,500	-1,250	-1,000	-750	-500	-300	-100	0
1	500	400	250	150	100	50	0	0	0

Initial Supporting table - DFCO ZeroPedalTorqueDisableOfst

Description:

DFCO_ZeroPedalTorqueDisableOfst - Part 1

y/x	CeDTRR_e_TrqShapingRateA	CeDTRR_e_TrqShapingRateB	CeDTRR_e_TrqShapingRateC	CeDTRR_e_TrqShapingRateD	CeDTRR_e_TrqShapingRateE
CeTCOR_e_Exh_Normal	10	10	10	10	10
CeTCOR_e_Exh_Sport	10	10	10	10	10
CeTCOR_e_Exh_Track	10	10	10	10	10

DFCO_ZeroPedalTorqueDisableOfst - Part 2

y/x	CeDTRR_e_TrqShapingRateF	CeDTRR_e_TrqShapingRateG	CeDTRR_e_TrqShapingRateH	CeDTRR_e_TrqShapingRateI	CeDTRR_e_TrqShapingRateJ
CeTCOR_e_Exh_Normal	10	10	10	10	10
CeTCOR_e_Exh_Sport	10	10	10	10	10
CeTCOR_e_Exh_Track	10	10	10	10	10

Initial Supporting table - RufCyl Decel

Description: Used for P0300-P0308. Crankshaft decel threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Decel - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
2	6,475	4,571	2,783	1,801	1,301	1,105	847	577	447	275	175	159	116
4	6,673	4,459	2,877	1,830	1,307	1,081	799	552	431	275	180	175	127
6	6,938	5,082	3,004	1,886	1,327	1,063	760	531	431	279	187	188	136
8	7,231	5,375	3,197	1,950	1,347	1,044	741	570	444	288	230	201	145
10	7,524	5,667	3,357	2,005	1,366	1,060	753	593	467	318	277	223	165
12	7,817	5,959	3,516	2,133	1,481	1,114	813	655	504	353	325	250	181
14	8,110	6,251	3,675	2,250	1,623	1,243	916	721	575	400	372	284	209
16	8,403	6,544	3,835	2,408	1,766	1,372	1,035	824	646	447	418	325	237
18	8,696	6,836	3,994	2,567	1,909	1,501	1,154	928	717	505	469	366	265
20	8,988	7,128	4,153	2,725	2,051	1,629	1,273	1,032	797	562	516	407	293
22	9,281	7,421	4,313	2,883	2,194	1,758	1,392	1,136	884	633	570	448	321
24	9,574	7,713	4,472	3,042	2,336	1,887	1,511	1,240	972	704	624	489	349
26	9,867	8,005	4,631	3,200	2,479	2,016	1,630	1,344	1,059	774	679	530	377
30	10,453	8,590	4,950	3,517	2,764	2,273	1,869	1,552	1,234	916	787	613	433
40	11,917	10,052	5,746	4,309	3,476	2,917	2,464	2,071	1,670	1,269	1,059	818	573
60	14,845	12,975	7,340	5,893	4,902	4,205	3,655	3,110	2,543	1,977	1,602	1,229	853
78	17,408	15,532	8,734	7,280	6,149	5,331	4,698	4,020	3,307	2,595	2,078	1,588	1,097

RufCyl_Decel - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	117	99	77	56	52	34	23	16	11	10	9	7	6
4	117	99	75	61	53	39	23	15	10	10	9	7	6
6	117	99	75	65	54	43	23	15	10	9	9	6	5
8	117	103	79	70	58	46	24	15	10	8	8	6	5
10	135	110	85	74	62	50	25	15	10	8	8	6	5
12	151	121	91	78	66	54	26	16	11	8	8	6	5
14	171	137	99	83	69	58	27	17	13	9	7	6	5
16	192	153	107	87	73	62	29	19	15	10	8	6	5
18	209	170	118	91	78	66	34	22	16	12	9	7	6
20	229	186	131	96	83	73	39	25	18	13	9	8	7
22	248	202	144	105	88	80	44	28	20	14	10	9	7

Initial Supporting table - RufCyl Decel

24	267	219	157	115	96	87	48	31	22	16	11	9	8
26	286	235	170	126	104	94	53	34	24	17	12	10	9
30	323	268	197	147	121	107	63	40	27	20	14	12	11
40	417	349	263	198	161	141	86	54	36	27	19	16	14
60	605	513	394	302	243	209	134	83	55	41	28	24	22
78	769	656	510	393	315	268	175	108	70	53	35	31	28

Initial Supporting table - RufCyl Jerk

Description: Crankshaft jerk threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufCyl_Jerk - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
2	7,159	4,163	2,943	1,762	1,183	839	683	450	350	300	225	200	169
4	7,493	4,544	3,169	1,960	1,331	855	683	400	300	200	200	202	146
6	7,940	5,053	3,472	2,224	1,528	876	683	400	350	200	200	200	140
8	8,386	5,557	3,774	2,488	1,725	1,022	800	450	400	250	250	220	143
10	8,832	6,060	4,077	2,752	1,922	1,174	964	550	500	350	335	241	158
12	9,278	6,564	4,475	3,016	2,119	1,384	1,141	750	650	450	389	268	178
14	9,725	7,067	4,824	3,283	2,285	1,610	1,318	950	766	550	448	289	216
16	10,171	7,571	5,257	3,646	2,568	1,837	1,495	1,114	873	632	525	349	270
18	10,617	8,074	5,691	4,009	2,851	2,063	1,672	1,254	982	711	602	409	308
20	11,064	8,578	6,124	4,371	3,133	2,289	1,849	1,394	1,103	811	679	470	347
22	11,510	9,082	6,558	4,734	3,416	2,515	2,026	1,535	1,223	912	756	530	386
24	11,956	9,585	6,992	5,097	3,699	2,741	2,203	1,675	1,344	1,013	832	590	425
26	12,403	10,089	7,425	5,460	3,982	2,968	2,379	1,815	1,465	1,114	909	650	463
30	13,295	11,096	8,292	6,185	4,548	3,420	2,733	2,096	1,706	1,316	1,063	771	541
40	15,527	13,614	10,461	7,999	5,962	4,551	3,618	2,797	2,309	1,821	1,447	1,072	735
60	20,000	18,563	14,797	11,626	8,791	6,812	5,387	4,200	3,515	2,830	2,215	1,674	1,126
78	20,000	20,000	18,591	14,800	11,267	8,791	6,934	5,428	4,570	3,713	2,886	2,202	1,475

RufCyl_Jerk - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	122	90	90	72	60	43	27	20	15	13	9	7	7
4	124	91	88	72	59	44	27	19	14	12	9	7	7
6	125	95	87	72	59	45	28	18	13	10	8	7	7
8	127	102	90	75	62	48	28	18	13	10	8	7	7
10	134	106	91	81	66	49	28	18	13	10	8	7	7
12	149	115	98	84	70	52	30	18	14	10	9	7	7
14	177	127	105	92	74	55	33	20	16	11	10	7	7
16	205	144	115	97	79	58	36	23	19	13	12	8	8
18	232	164	129	103	85	64	41	26	21	15	13	9	8
20	260	183	144	112	94	71	46	30	23	16	14	10	9
22	288	202	159	122	103	79	51	33	25	18	15	11	10

Initial Supporting table - RufCyl Jerk

24	316	221	174	133	112	86	56	36	27	20	16	12	11
26	344	240	189	144	121	93	61	39	30	21	18	13	12
30	399	278	218	166	139	108	72	46	34	25	20	15	13
40	538	373	292	220	183	145	97	62	45	33	26	20	17
60	816	564	440	329	273	218	149	94	68	50	38	29	25
78	1,059	731	570	425	352	282	194	122	87	64	49	37	32

Initial Supporting table - RufSCD Decel

Description: Used for P0300-P0308. Crankshaft decel threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts, (especially decel and jerk thresholds since they track actual air trapped in cylinder)

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Decel - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

RufSCD_Decel - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Decel

20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (usee)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Jerk - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
2	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
4	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
6	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
8	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
10	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
12	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
14	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
16	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
18	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
20	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
22	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
24	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
26	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
30	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
40	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
60	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768
78	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768	32,768

RufSCD_Jerk - Part 2

y/x	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
4	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - Misfire_IMEP_BinID_Load_Axis

Description: Cylinder LOAD for defining Y AXIS in Misfire_IMEP_BinID_versus_Speed_and_Load

Value Units: Indicated Mean Effective Pressure
X Unit: Bin ID row number

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	50	125	175	225	275	325	375	425	475	525	600	700	825	975	1,175	1,425	1,675

Initial Supporting table - Misfire_IMEP_BinID_RPM_Axis

Description: Cylinder RPM for defining the X AXIS in Misfire_IMEP_BinID_versus_Speed_and_Load

Value Units: RPM
X Unit: BinID Column number

y/x	1	2	3	4	5	6	7	8	9
1	880	1,110	1,340	1,570	1,800	2,030	2,260	2,490	2,720

Initial Supporting table - Misfire_IMEP_BinID_vs_RPM_Load

Description: Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load "bin". Each Bin has has its own "bin ID". This Bin ID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table. The BinID tables Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

Value Units: Bin ID
X Unit: RPM range
Y Units: Cylinder Load Range

y/x	0	1	2	3	4	5	6	7	8
0	1	18	35	53	70	86	103	120	138
1	1	18	35	53	70	86	103	120	138
2	2	19	36	54	71	87	104	121	138
3	3	20	37	54	71	88	105	122	139
4	4	21	38	55	72	89	106	123	140
5	5	22	39	56	73	90	107	124	141
6	6	23	40	57	74	91	108	125	142
7	7	24	41	58	75	92	109	126	143
8	8	25	42	59	76	93	110	127	144
9	9	26	43	60	77	94	111	128	145
10	10	27	44	61	78	95	112	129	146
11	11	28	45	62	79	96	113	130	147
12	12	29	46	63	80	97	114	131	148
13	13	30	47	64	81	98	115	132	149
14	14	31	48	65	82	99	116	133	150
15	15	32	49	66	83	100	117	134	151
16	16	33	50	66	83	100	117	134	151

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

Description: Crankshaft Indicated Mean Effective Pressure (IMEP) Estimate that below which will be considered misfire. Misfire calibrations used with Crankshaft Based IMEP (Indicated Mean Effective Pressure) estimatimation do not interpolate versus speed and load. Instead they use unique calibrations within each small speed load region or "bin". Each Bin has has its own "BinID". This BinID keeps all the Crank Based IMEP estimate calculations and various Misfire calibrations synchronized while minimzing through put. Each speed load range defines a unique "Bin ID" in this Bin ID table.
The BinID table's Y axis is cylinder load, and X axis is rpm as defined in Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

Value Units: KPa
XUnit: BinID

Misfire_IMEP_Thresh_vs_BinID - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777

Misfire_IMEP_Thresh_vs_BinID - Part 2

y/x	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1	-777	-777	50	50	50	70	60	60	45	35	40	50	50	80	80	200	-777

Misfire_IMEP_Thresh_vs_BinID - Part 3

y/x	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
1	-777	50	50	30	60	70	50	80	70	80	30	50	80	80	200	200	-777

Misfire_IMEP_Thresh_vs_BinID - Part 4

y/x	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
1	-777	50	60	50	80	80	70	40	80	50	100	100	200	120	200	200	-777

Misfire_IMEP_Thresh_vs_BinID - Part 5

y/x	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
1	-777	50	50	50	100	100	100	50	80	100	100	100	200	150	150	150	-777

Misfire_IMEP_Thresh_vs_BinID - Part 6

y/x	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101
1	-777	50	30	70	100	150	60	50	50	100	160	80	150	100	80	70	-777

Misfire_IMEP_Thresh_vs_BinID - Part 7

y/x	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
1	-777	50	40	50	30	100	100	100	80	80	80	100	200	100	80	80	-777

Misfire_IMEP_Thresh_vs_BinID - Part 8

y/x	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135
1	-777	30	35	80	100	100	50	80	60	80	100	100	150	200	200	200	-777

Misfire_IMEP_Thresh_vs_BinID - Part 9

y/x	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152

Initial Supporting table - Misfire_IMEP_Thresh_vs_BinID

1	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777	-777

Initial Supporting table - P0191 - High fail limit of fuel control due to high pressure sensor skewed High

Description: High fail limit of fuel control due to high pressure sensor skewed High error as Function of desired pressure

Value Units: Ratio
X Unit: Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.09	1.05

Initial Supporting table - P0191 - Low fail limit of fuel control due to pressure sensor skewed low

Description: Low fail limit of fuel control due to pressure sensor skewed low error as Function of desired pressure

Value Units: Ratio
X Unit: Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	0.75	0.75	0.75	0.75	0.80	0.82	0.86	0.92	0.95

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time

Description: Maximum injector closing time function of measured fuel rail pressure

Value Units: Injector Closing Time (us)
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	134	106	93	81	74	72	69	67	64	59	55	50	46	42	37	35	33

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Opening Magnitude

Description: Maximum injector opening Magnitude voltage function of measured fuel rail pressure

Value Units: Opening Magnitude Voltage
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	883	975	974	969	975	973	976	980	982	984	985	987	990	992	995	996	996

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Closing Time

Description: Minimum injector closing time function of measured fuel rail pressure

Value Units: Injector Closing Time (us)
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	134	106	93	81	74	72	69	67	64	59	55	50	46	42	37	35	33

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Minimum Injector Opening Magnitude

Description: Minimum injector opening Magnitude voltage function of measured fuel rail pressure

Value Units: Opening Magnitude Voltage
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	283	375	374	369	375	373	376	380	382	384	385	387	390	392	395	396	396

al Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Voltage Feedback Rationalities Minimum Pulse Width

Description: Minimum injection pulse width function of measured fuel rail pressure where the voltage feedback measured from the analog to digital converter is rationalized

Value Units: Pulse Width (ms)
X Unit: Measrured Fuel Rail Pressure (MPa)

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit

Description: Minimum Small Pulse Compensation Fail Limit function of Pulse Width and Pressure

Value Units: Minimum Small Pulse Compensation Fail Limit (ms)
X Unit: Measrured Fuel Rail Pressure (MPa)
Y Units: Injection Pulse With (ms)

P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 1

y/x	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04
0.40	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14
5.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05
10.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
15.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
18.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
19.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
20.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
21.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
22.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.04
24.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.04
26.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04
28.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
30.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
32.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
34.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
35.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05
36.00	-0.01	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.05

P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 2

y/x	0.04	0.05	0.05	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.10
0.40	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14
5.00	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.11
10.00	-0.04	-0.04	-0.05	-0.05	-0.05	-0.07	-0.08	-0.08	-0.09	-0.09	-0.11
15.00	-0.04	-0.04	-0.04	-0.04	-0.04	-0.05	-0.08	-0.08	-0.09	-0.09	-0.11
18.00	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.08	-0.09	-0.09	-0.11
19.00	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.08	-0.09	-0.09	-0.11
20.00	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.08	-0.09	-0.09	-0.11
21.00	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.08	-0.09	-0.09	-0.11
22.00	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.09	-0.09	-0.11
24.00	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.09	-0.09	-0.11
26.00	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07	-0.09	-0.09	-0.11

Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit

28.00	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.11
30.00	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.11
32.00	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.11
34.00	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.11
35.00	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.11
36.00	-0.05	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.11

P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit - Part 3

y/x	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	1.00	1.50
0.40	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.20	-0.20
5.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
10.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
15.00	-0.14	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
18.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
19.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
20.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
21.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
22.00	-0.14	-0.19	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
24.00	-0.15	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
26.00	-0.15	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
28.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
30.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
32.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
34.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
35.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
36.00	-0.16	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20

Initial Supporting table - P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit

Description: Maximum Small Pulse Compensation Fail Limit function of Pulse Width and Pressure

Value Units: Maximum Small Pulse Compensation Fail Limit (ms)
X Unit: Measrured Fuel Rail Pressure (MPa)
Y Units: Injection Pulse With (ms)

P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 1

y/x	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
5.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
22.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
26.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 2

y/x	0.04	0.05	0.05	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.10
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
5.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
22.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
26.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Initial Supporting table - P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit

28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 3

y/x	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	1.00	1.50
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
5.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
10.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
15.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
22.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
26.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
28.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
32.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
34.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
35.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
36.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Initial Supporting table - P228C P2C1F - High Pressure Pump Control (HPC) fail threshold of pressure too low

Description: The High Pressure Pump Control (HPC) fail threshold of pressure too low test as a function of desired fuel pressure.

Value Units: Pressure Error - Desired pressure - Actual Pressure (Mpa)
X Unit: Desired Pressure (Mpa)

y/x	2	3	4	15	20	25	28	32	36
1	0	2	3	3	3	3	3	3	3

Initial Supporting table - P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high

Description: The High Pressure Pump Control (HPC) fail threshold for pressure too high test as a function of desired fuel pressure.

Value Units: Pressure Error - Desired pressure - Actual Pressure (Mpa)
X Unit: Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00	-3.00

- P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F - kaFULO_n_RP

Description: Max Engine Speed to allow Multipulse function of injector energy profile

Value Units: Max Engine Speed to allow Multipulse
X Unit: Injector Energy Profile
Y Units: Multipulse Mode (0 = Double Pulse, 1 = Triple Pulse)

y/x	0	1	2	3	4	5
0	3,600	3,600	3,600	3,600	3,600	3,600
1	3,000	3,000	3,000	3,000	3,000	3,000

P2B01P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2 De

Description: Opening Magnitude 2 Delta threshold to detect missing injection pulse

Value Units: Opening Magnitude 2 Delta Voltage
X Unit: Measured Fuel Rail Pressure

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00

0 1>2B01P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude 2

Description: Opening Magnitude 2 threshold to detect missing injection pulse

Value Units: Opening Magnitude 2 Voltage
X Unit: Measured Fuel Rail Pressure

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94	2,047.94

00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitu ie r

Description: Opening Magnitude threshold to detect missing injection pulse

Value Units: Opening Magnitude Voltage
X Unit: Measured Fuel Rail Pressure

y/x	0.40	5.00	10.00	15.00	18.00	19.00	20.00	21.00	22.00	24.00	26.00	28.00	30.00	32.00	34.00	35.00	36.00
1.00	0.00	109.88	97.19	88.81	79.13	65.81	79.50	70.13	80.19	67.81	70.00	59.00	51.19	53.69	42.38	47.81	47.88

Initial Supporting table - P0330_OpenCktThrshMax2 (20kHz)

Description: Max threshold table for the 20 KHz portion of the open circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	4.086	4.086	4.063	4.063	4.033	4.053	4.033	4.055	4.055	4.055	4.055	4.055	4.055	4.055	4.055	4.055	4.055

Initial Supporting table - P0330_OpenCktThrshMax2 (NN)

Description: Max threshold table for the Normal Noise for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.480	0.449	0.410	0.400	0.400	0.400	0.400	0.400	0.400	0.400

Initial Supporting table - P0330_OpenCktThrshMin2 (20 kHz)

Description: Min threshold table for the Normal Noise portion of the open circuit diagnostic. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.100	2.199	2.301	2.500	2.621	2.621	2.621	2.621	2.621	2.621

Initial Supporting table - P0330_OpenCktThrshMin2 (NN)

Description: Min threshold table for the Normal Noise portion of the open circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold or the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.160	0.154	0.115	0.113	0.100	0.100	0.100	0.100	0.100	0.100

Initial Supporting table - P0331_AbnormalLo2

Description: The low limit (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD_k_PerfAbnFilter (KeKNKD_k_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD_k_PerfAbnFiltlLimitLo (VaKNKD_k_PerfCylAbnFiltlLimitLo for per cyl) becomes the actual limit. The code will immediately set if the filtered intensity goes below the filtered threshold

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.413	0.413	0.413	0.413	0.413	0.361	0.299	0.222	0.180	0.144	0.122	0.114	0.114	0.114	0.114	0.114	0.114

Initial Supporting table - P0331_AbnormalLoAFM_2

Description: The low limit for AFM mode (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD_k_PerfAbnFilter (KeKNKD_k_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD_k_PerfAbnFiltlLimitLo (VaKNKD_k_PerfCylAbnFiltlLimitLo for per cyl) becomes the actual limit. The code will immediately set if the filtered intensity goes below the filtered threshold

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.413	0.413	0.413	0.413	0.413	0.361	0.299	0.222	0.180	0.144	0.122	0.114	0.114	0.114	0.114	0.114	0.114

Initial Supporting table - P04DB: Crankcase Pressure Noise Normalization for Engine Speed, high case

Description: Value to normalize the Crankcase Pressure signal noise based on engine speed, high case

Value Units: Scaling Factor for Noise (Unitless)
X Unit: Engine Speed (RPM)
Y Units: None

y/x	500	800	1,100	1,400	1,700	2,000	2,300	2,600	2,700
1	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00

Initial Supporting table - P04DB: Crankcase Pressure Noise Normalization for Engine Speed, low case

Description: Value to normalize the Crankcase Pressure signal noise based on engine speed, low case

Value Units: Scaling Factor for Noise (Unitless)
X Unit: Engine Speed (RPM)
Y Units: None

y/x	500	800	1,100	1,400	1,700	2,000	2,300	2,600	2,700
1	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00

Initial Supporting table - P04DB: Crankcase Pressure Signal Normalization for Air Flow, high case

Description: Value to normalize the Crankcase Pressure signal based on engine airflow, low case

Value Units: Scaling Factor for Signal (Unitless)
X Unit: Engine Air Flow (Grams/Second)
Y Units: None

y/x	10	15	20	25	30	35	40	45	50
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - P04DB: Crankcase Pressure Signal Normalization for Air Flow, low case

Description: Value to normalize the Crankcase Pressure signal based on engine airflow, low case

Value Units: Scaling Factor for Signal (Unitless)
X Unit: Engine Air Flow (Grams/Second)
Y Units: None

y/x	10	15	20	25	30	35	40	45	50
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - P04DB: MAP Transient Delay Active Time

Description: MAP Transient Delay Active Time

Value Units: MAP Transient Delay (seconds*10)
X Unit: MAP Transient Delta (kPa)
Y Units: None

y/x	175.0	185.0	196.0	207.0	218.0	239.0	240.0
1	0	0	0	0	0	0	0

Initial Supporting table - P04DB: MAP Transient Delta Threshold

Description: MAP Transient Delta Threshold

Value Units: MAP Transient Delta (kPa)
X Unit: Engine Speed (RPM)
Y Units: None

y/x	500	800	1,100	1,400	1,700	2,000	2,300
1	175.0	185.0	196.0	207.0	218.0	239.0	240.0

Initial Supporting table - P06B7_OpenTestCktMax2

Description: Max threshold table for the 20 KHz for the test circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the min cal filters.

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.262	0.262	0.264	0.277	0.287	0.320	0.346	0.420	0.439	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - P06B7_OpenTestCktMin2

Description: Min threshold table for the 20 KHz for the test circuit diagnostic for sensor 2. The lookup into this table will be filtered to define the max threshold for the filtered intensity. To fail, the filtered intensity needs to fall between this cal and the max cal filters.

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.127	0.129	0.133	0.135	0.141	0.145	0.156	0.180	0.199	0.207	0.207	0.207	0.207	0.207	0.207	0.207	0.207

Initial Supporting table - P0324_PerCyl_ExcessiveKnock_Threshold

Description: Fail threshold for the Knock Performance per-cylinder Excessive Knock Diagnostic

Value Units: Filtered Knock Intensity. Unit-less term scaled from 0.0 (no knock) to 5.0 (maximum/large knock)
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	1.63	1.63	1.75	1.88	2.13	2.38	2.13	1.88	2.25	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63

Initial Supporting table - P0325_P0330_OpenCktThrshMax (20 kHz)

Description: Knock Open Circuit Diagnostic Maximum Threshold when using the 20 kHz method (see "OpenMethod" description)

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine Speed (RPM).
Y Units: N/A

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	4.0859	4.0859	4.0625	4.0625	4.0332	4.0527	4.0332	4.0547	4.0547	4.0547	4.0547	4.0547	4.0547	4.0547	4.0547	4.0547	4.0547

Initial Supporting table - P0325_P0330_OpenCktThrshMax (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	1.0000	1.0000	1.0000	1.0000	0.9004	0.8008	0.6992	0.5996	0.5996	0.5996	0.5996	0.5508	0.5000	0.5000	0.5000	0.5000	0.5000

Initial Supporting table - P0325_P0330_OpenCktThrshMin (20 kHz)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the 20 kHz method (see "OpenMethod" description)

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine (RPM)
Y Units: N/A

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0996	2.1992	2.3008	2.5000	2.6211	2.6211	2.6211	2.6211	2.6211	2.6211

Initial Supporting table - P0325_P0330_OpenCktThrshMin (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.1992	0.1992	0.1992	0.1992	0.1992	0.1992	0.1992	0.1602	0.1543	0.1152	0.1133	0.0996	0.0996	0.0996	0.0996	0.0996	0.0996

Initial Supporting table - P032!5_P0330_OpenMethod_2

Description: Defines which Knock Open Circuit Diagnostic method to use.

Value Units: Identifies one of two diagnostic methods (either 20 kHz or Normal Noise) used (as a function of engine speed) for Open Circuit detection
X Unit: Engine Speed Index, 500 to 8500 (RPM) by 500 rpm increments (Index 0, 1, 2.... 16 = 500, 1000, 1500.... 8500 RPM)
Y Units: N/A

P0325_P0330_OpenMethod_2 - Part 1

y/x	0	1	2	3	4
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz

P0325_P0330_OpenMethod_2 - Part 2

y/x	5	6	7	8	9
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_UseExact RPM	CeKNKD_e_Open_NormalNoi se	CeKNKD_e_Open_NormalNoi se

P0325_P0330_OpenMethod_2 - Part 3

y/x	10	11	12	13	14
1	CeKNKD_e_Open_NormalNoi se	CeKNKD_e_Open_NormalNoi se	CeKNKD_e_Open_NormalNoi se	CeKNKD_e_Open_NormalNoi se	CeKNKD_e_Open_NormalNoi se

P0325_P0330_OpenMethod_2 - Part 4

y/x	15	16			
1	CeKNKD_e_Open_NormalNoi se	CeKNKD_e_Open_NormalNoi se			

Initial Supporting table - P0326_P0331_AbnormalNoise_CylsEnabled

Description: Specifies which cylinders will be used for the Abnormal Noise portion of the performance diagnostics (1 = cylinder used, 0 = cylinder not used)

Value Units: Boolean that indicates which engine cylinders are being used for the per-sensor Knock Performance diagnostic (0 = not used, 1 = used)
X Unit: Cylinder number in firing order (i.e. Cyl 0 = first cylinder in firing order, Cyl 1 = second cylinder in firing order....)
Y Units: N/A

y/x	0	1	2	3	4	5	6	7
1	1	1	1	1	0	0	0	0

Initial Supporting table - P0326_P0331_AbnormalNoise_Threshold

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine is NOT in AFM mode

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.413	0.413	0.413	0.413	0.413	0.361	0.299	0.222	0.180	0.144	0.122	0.114	0.114	0.114	0.114	0.114	0.114

Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMax

Description: Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.262	0.262	0.264	0.277	0.287	0.320	0.346	0.420	0.439	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMin

Description: Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine Speed (RPM).
Y Units: N/A

y/x	680	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.127	0.129	0.133	0.135	0.141	0.145	0.156	0.180	0.199	0.207	0.207	0.207	0.207	0.207	0.207	0.207	0.207

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Steering Wheel Positon Sensor	C0051	Monitoring for steering angle sensor intitialization. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	The Steering Angle Sensor is not initialized	TRUE	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	INSTANT	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C0051	Monitoring for steering angle sensor calibration status. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	The Steering Angle Sensor is not calibrated	TRUE	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	INSTANT	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C0051	This monitoring checks if the steering angle signal is constant when it should change. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Variation of steering angle signal during left and right curve since last vechicle standstill	< 5 [deg]	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	40 ms	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C0051	This monitoring checks if the steering angle velocity is plausible or not. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Variation of steering angle signal during left and right curve since last vechicle standstill	< 5 [deg]	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	40 ms	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C0051	This monitoring checks if the steering angle velocity is plausible or not. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Steering angle signal gradient OR Steering angle signal gradient after 2 messages OR Steering angle signal gradient after 3 messages	> 30 [deg]/0.020 [s] > 60 [deg]/0.020 [s] > 90 [deg]/0.020 [s]	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	60 ms	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C0051	This monitoring checks if the Steering angle offset has an acceptable value.. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Steering angle offset	> 15 [deg]	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	INSTANT	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C0051	This monitoring checks the Steering Angle Sensor's range by checking the raw sensor signal. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Absolute value of received raw sensor signal	> 810 [deg]	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	300 ms	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C0051	This monitoring checks if the steering angle signal is physically plausible. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Difference between measured steering angle and model calculated value based on yaw rate signal	> 10-100 [deg/s] velocity dependent (the bigger the velocity, the lower the threshold)	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	0.4 [s] -4.8 [s] depending on the extent of the deviation - the larger the deviation is, the smaller the detection time	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C0051	This monitoring checks if the sign of the steering angle signal is incorrect.. Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Calculated integral value during forward driving OR Calculated integral value independently from driving direction	> -30 [deg] '> -90 [deg]	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	INSTANT	Safety Emissions Neutral Diagnostic - Type C
Steering Wheel Positon Sensor	C1211	This monitoring checks for an error in the Steering Wheel Angle Sensor Signal Message Counter . Emissions neutral default action: disable steering angle based auto-stop inhibit and perform auto-stops.	Communication of the Alive Rolling from the Steering Wheel Angle Sensor over CANbus is incorrect for out of total samples Communication of theProtection Value from the Steering Wheel Angle Sensor over CANbus is incorrect for out of total samples	>= 15.00 counts >= 18.00 counts >= 2.00 counts >= 18.00 counts	Diagnostic Voltage Vehicle Power Mode	= Enabled = 6V < voltage < 16V = RUN	= Isavailable	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.
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 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 lateral longitudinal acceleration signal stability time > 10.0 seconds, 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 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, 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.
					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	region 2 fail time > 75.0 seconds out of region 2 sample time > 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) 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, 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.
					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	region 3 fail time > 75.0 seconds out of region 3 sample time > 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) 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, fail time > 75.0 seconds out of sample time > 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					diagnsotic fault sequence gear active	= FALSE		
					P0716 fault active	= FALSE		
					P0716 test fail this key on	= FALSE		
					P0717 fault active	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF fault active	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 fault active	= FALSE		
					P07C0test fail this key on	= FALSE		
					attained gear	= 1st thru 10th		
					ABS(raw longitudinal acceleration signal)	> 0.5300 g		
					AND			
					ABS(raw longitudinal acceleration signal)	< 3.8500 g		
					update region 4 sample time:		region 4 fail time > 2.0 seconds out of region 4 sample time > 2.5 seconds, 50 millisecond update rate	
					brake pedal position	< 0.70 %		
					engine torque	< 50.0 Nm		
					TOSS vehicle speed acceleration	< -0.1700 g		
					TOSS vehicle speed	> 2.0 KPH		
					TOSS vehicle speed	< 120.0 KPH		
					ABS(raw longitudinal acceleration signal) update sample time	< 0.5300 g		
					U0073 fault active	= FALSE		
					U0073 test fail this key on	= FALSE		
					DTCs not fault active	VehicleSpeedSensor_FA VehicleSpeedSensorError		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault. This includes Primary Processor System RAM Fault, Primary Processor Cache RAM Fault, Primary Processor TPU RAM Fault, Primary Processor Update Dual Store RAM Fault, Primary Processor Write Protected RAM Fault, and Secondary Processor RAM Fault. This diagnostic runs continuously.	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	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 ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	Time new seed not received exceeded			always running	500 milliseconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	18 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test is Enabled: 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 ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization.	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Counter >=					
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 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: **P0606 PFM Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main orocessor	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 = 2 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	< -183.0 RPM/sec Else < -183.0 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	= Reverse			6.25 ms update rate	
			Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)	Current driver requested range	= previous driver requested range	> **Incorrect Direction Range Change Delay Time**	
			Incrorrect reverse disable calibration	= 0 (0 to enable, 1 to enable)				
			Neutral:		(vehicle speed AND	> -6.00 KPH		
			An invalid combinatio of neutral clutches commanded on*	= **Illegal Park-Neutral Clutch Combinations**	vehicle speed OR Fail Timer)	> 6.00 KPH >0.0		
			driver requested range	= Neutral	clutch connectivity monitor enable OR	= 1 (1 to enable, 0 to disable		
			Incorrect neural enable calibration	= 1 (1 to enable, 0 to disable)	clutch connectivity monitor disable	= 0 (0 to enable, 1 to disable)		
			Incrorrect neutral disable calibration	= 0 (0 to enable, 1 to disable)	Service Fast Learn OR	= FALSE		
			Park:		(Service Fast Learn AND	= TRUE		
			An invalid combination of reverse clutches commanded on*	= **Illegal Park-Neutral Clutch Combinations**	Vehicle Speed for vehicle speed time) High Side Driver 1 On High Side Driver 2 On	> 8.0 KPH > 2.50 = TRUE = TRUE		
			driver requested range	= Park	DTCs Not Fault Active	P077C, P077D, P0721		
			Incorrect park enable calibration	= 1 (1 to enable, 0 to disable)	DTCs Not Test Failed This Key On	P0723, P0722, P172A, P172B		
			Incrorrect park disable calibration	= 0 (0 to enable, 1 to disable)	* Note, clutch is considered "on" when the following conditions are met:			
					Clutch commanded	>		

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 > 0.00 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 Plus following criteria based on driver requested range: Drive: driver requested range Incorrect drive enable calibration Incrorrect drive disable calibration Reverse: driver requested range Incorrect reverse enable calibration Incrorrect reverse disable calibration Neutral: driver requested range Incorrect neural enable calibration Incrorrect neutral disable calibration Park: driver requested range	= FORWARD = REVERSE = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = Reverse = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to enable) = Neutral = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = Park	met, increment ratio monitor fault pending timer: vehicle speed OR vehicle speed (note: fault pending will remain latched if vehicle speed max thresholds are exceeded) Monitor Armed Measured output speed direction Input speed default direction Current driver requested range for range time based on PRNDL position: driver requested range AND transmission measured speed ratio AND Loop-to-loop change in measured ratio AND (Direction By Ratio OR Direction By Clutch Slip)	> 0.50 AND < 6.00 KPH <-0.50 AND >-6.00 KPH = TRUE = REVERSE or FORWARD = REVERSE or FORWARD = previous driver requested range > **Incorrect Direction Range Change Delay Time** = Reverse > 0.40 > -8.00 = FORWARD = a FORWARD Gear	**Ratio Monitor Fail Increment Rate (Percent per Loop)** when timer reaches 100, set fault pending Fail time based on driver requested range (once fault pending has matured): **Incorrect Drive Fail Time** **Incorrect Reverse Fail Time** **Incorrect Neutral Fail Time** **Incorrect Park Fail Time** 6.25 ms update rate	

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

			Incorrect park enable calibration
			
			Incrorrect park disable calibration
				= 1 (1 to enable, 0 to disable)
				
				= 0 (0 to enable, 1 to disable)
					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
						= 0 (1 to enable, 0 to disable)
						= 1 (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	> 4.80 AND < 4.92		
					THEN Direction by Ratio	= REVERSE		
					ELSE WHEN Measured output speed direction	= forward		
					AND Absolute measured gear ratio	> 4.65 AND < 0.66		
					THEN Direction by Ratio	= FORWARD		
					******************************	******************************		
					Direction by Clutch Slip:			
					C1 clutch slip valid	= TRUE		
					C2 clutch slip valid	= TRUE		
					C5 clutch slip valid	= TRUE		
					C3C4 dual clutch slip valid	= TRUE		
					C3C6 dual clutch slip valid	= TRUE		
					C4C6 dual clutch slip valid	= TRUE		
					Direction by Clutch Slip Enable cal	= 1 (1 to enable, 0 to disable)		
					(vehicle speed	> 0.50 KPH		
					OR vehicle speed)	< -0.50 KPH		
					for each clutch: current clutch slip	**Ratio Monitor Slip < Threshold** (if slip condition met, clutch held = 1, else held = 0)		
					clutch held combination matches a valid gear in:	**Ratio Monitor Clutch States**		

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 ECM/TCM is processing code correctly. TheTCM computes the correct pattern received via a CAN message from the ECM. When the TCM does not receive a correct pattern or a missing pattern from the ECM, the DTC is set.	Received pattern from the TCM OR Received malfunction pattern	# expected pattern >= 2 counts	Run Crank Active Time	Run or Crank >= 500 milliseconds	6/12 counts or 2,000 milliseconds continuous; 25 ms/count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio n 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	< 15.0 °C			transmission fluid temperature warm up time > **transmission fluid temperature warm up time** seconds	Type B, 2 Trips
					diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active	= 1 Boolean		
					battery voltage	>9.00 volts	battery voltage time > 0.100 seconds	
					run crank voltage	>9.00 volts	run crank voltage time > 0.100 seconds	
					warm up test enable	= 1 Boolean		
					TFT rationality diagnostic monitor enabled	= VeTFSR_b_TFT_RatlEnbl		
					driver accelerator pdeal position	> 5.0 %		
					engine torque	> 50.0 Nm		
					engine speed	> 500.0 RPM		
					vehicle speed	> 10.0 KPH		
					engine coolant temperature	> -40.0 °C		
					engine coolant temperature	< 150.0 °C		
					raw transmission fluid temperature	> -273.0 °C		
					raw transmission fluid temperature	< 150.0 °C		
					P2818 fault active	= FALSE		
					P2818 test fail this key on	= FALSE		
					DTCs not fault active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 > 300.0 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	< 13.500 Q	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean >9.00 volts >9.00 volts	fail time > 5.00 seconds out of sample time > 6.00 seconds 1 seconds update rate battery voltage in range time > 0.100 seconds run crank voltage in range time > 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0713	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to voltage failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	>284,177.0 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 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	= FALSE >9.00 volts = 1 Boolean = FALSE = FALSE = FALSE = TRUE = TRUE = FALSE > 5.00 volts	fail time > 1.500 seconds updated fail event count, fail event count > 5 counts, 25 millisecond update rate	Type A, 1 Trips
					last valid raw transmission input speed OR valid raw transmission input speed (before drop event)	> 160.0 RPM > 160.0 RPM	raw transmission input speed time > 2.000 seconds	
					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)	< 320.0 RPM > 160.0 RPM	stability time > 0.100 seconds	
					raw transmission output speed	> 254.0 RPM		
					accelerator pedal position	> 5.0 %		
					engine torque	< 8,191.9 Nm		
					engine torque	> 30.0 Nm		
					transmission hydraulic pressure available: engine speed	 > 500.0 RPM	 engine speed time >	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate	**engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input Speed Sensor Circuit Low Voltage	P0717	Detects no activity in raw transmission input speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure.	raw transmission input speed OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE, update fail time 25 millisecond update rate	< 100.0 RPM < 475.0 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_Seventh > CeCGSR_e_CR_First > 162.0 RPM < CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Seventh	fail time > 4.00 seconds run crank voltage time > 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when: (P0722 fail time high gear exceeds fail threshold OR P0722 fail time low gear exceeds fail threshold) TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled transmission hydraulic pressure available: engine speed DTCs not fault active	> 263.0 RPM = FALSE = FALSE = 0 Boolean = 1 Boolean > 500.0 RPM EngineTorqueEstInaccurate	engine speed time > **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Performance	P0721	The diagnostic monitor determines if the direction TOSS value is coherent based on the on period time of the directional sensor and TOSS raw. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow TOSS raw RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	TOSS raw direction when TOSS transitional period = FALSE AND TOSS raw direction when TOSS transitional period = FALSE OR TOSS raw when TOSS transitional period = TRUE update fail and sample time 6.26 millisecond update rate	# FORWARD # REVERSE > 225.0 RPM	service mode $04 active diagnostic monitor enable TOSS count sample period P0721 fault active P0721 test fail this key on TOSS transitional period detected = FALSE when: on period on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward TOSS transitional period detected = TRUE when: on period on period when direction unknown senortype 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 > 50.0 Nm > 30.0 Nm > 5.0 % > 3.0 % < CeCGSR_e_CR_Fourth > 80.0 Nm > 50.0 Nm > 8.0 % > 5.0 %	fail time >5.00 seconds high gear OR fail time > 3.50 seconds low gear Engine Torque criteria met > 0.10 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR {}{Wheel Speed Rationality Enable AND Transfer Case Range Valid AND Vehicle Speed Fault AND Tease state AND Wheel Speed Sensor Present AND Output Speed calculate from wheel speed} TISS/TOSS has single power supply calibration AND TISS AND TISS) OR TISS/TOSS has single power supply calibration AND TISS AND TISS) P0716 test fail this key on P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on PTO check: PTO enable calibration is FALSE OR	 = 0.00 Boolean =TRUE = FALSE != Neutral = TRUE >= 100.00 rpm = 0 Boolean < 8,191.9 RPM > 475.0 RPM = 0 Boolean < 8,191.9 RPM > 5,800.0 RPM = FALSE = FALSE = FALSE = FALSE # 1 Boolean	Wheel Speed Rationality met = 0 s counts down from 0.25 s	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(PTO enable calibration is TRUE AND PTO active) run crank voltage service fast learn active run crank voltage transmission fluid temperature P0723 test fail this key on P077C test fail this key on P077D test fail this key on P0722 fault active P0722 test fail this key on transmission hydraulic pressure available: engine speed DTCs not fault active	= 1 Boolean = TRUE > 5.00 volts = FALSE >9.00 volts > -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE > 500.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	 run crank voltage time > 25 milliseconds engine speed time > **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Output Speed Sensor Circuit Intermittent	P0723	Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission output speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Output Speed Sensor Circuit Low Voltage" DTC will set before P0723, as P0723 is designed to set based on an intermittent raw transmission output speed signal RPM.	delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate Failing criteria depends on below decision tree for failure threshold If 4WD low engaged and wheel speed usage is not enabled Else If Wheel speed usage enabled for failing TOS drop diagnostic Else (Not 4WD and not Wheel Speed usage) If 4WD low is engaged and Wheel speed usage enabled	> 900.0 RPM **P0723 Wheel Speed Calc** function of output speed > 900.0 RPM > Above threshold * 1.00	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 PRNDL OR PRNDL OR raw transmission output speed OR last valid raw transmission output speed determine if raw transmission input speed is stable: ((raw transmission input speed - raw transmission input speed previous, 25 millisecond update AND raw transmission input speed) OR Wheel speed usage enabled for failing TOS drop diagnostic) OR (TISS/TOSS has single power supplv calibration	= CeTRGR_e_PRNDL_Neutral = CeTRGR_e_PRNDL_Transitionall N-D transitional = CeTRGR_e_PRNDL_Transitional4 R-N transitional > 250.0 RPM > 250.0 RPM < 4,095.9 RPM > 160.0 RPM = TRUE = 0 Boolean	raw transmission input speed stability time > 2.00 seconds 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)	> 89.0 RPM > 89.0 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 > 190.00 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 > 89.0 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.
Pressure Control (PC) Solenoid A Stuck Off	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	****************************** 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 > 3 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 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 > -999.00 kPa = TRUE = TRUE ****************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

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 (GF9 CB123456) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,500.0 RPM > 450.0 RPM		
					C1 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C1 clutch pressured map	= mapped to line pressure, C1 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 1.000 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 P178F P17C6 P17C4 P17C7 P172A P172B		
					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 > 0.80 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.150 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** 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 Stuck On Fail Offset Time NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100	

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 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean	seconds	
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) ****************************	> -999 kPa = TRUE = TRUE *****************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 89.0 RPM		
					((C1 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C1 off going clutch command pressure) (engine torque AND Primary oncominq stuck	< 100.0 kPa > 8,191.8 Nm = 0 (0 is enable, 1 is	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: **C1 exhaust delay garage shift** closed throttle downshift: **C1 exhaust delay closed throttle down shift** negative torque upshift: **C1 exhaust delay negative torque up shift** open throttle downshift: **C1 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: **C2 Powered Upshift Tq Based Pres Clip** OR **C3 Powered Upshift Tq Based Pres Clip** OR **C4 Powered Upshift Tq Based Pres Clip** OR **C5 Powered Upshift Tq Based Pres Clip** OR **C6 Powered Upshift Tq Based Pres Clip** coasting downshift dependent on oncoming clutch: **C2 Coasting Downshift Ta Based Pres Clio**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OR **C3 Coasting Downshift Tq Based Pres Clip** OR **C4 Coasting Downshift Tq Based Pres Clip** OR **C5 Coasting Downshift Tq Based Pres Clip** OR **C6 Coasting Downshift Tq Based Pres Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C1 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test: (current shift tvoe	# Garaqe shift		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND shift type enable cal for current shift type)	**Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active	= FALSE		
					AND shift type enable cal for garage shift	= 0 (0 will enable, 1 will enable)		
					AND Attained Gear	= NEUTRAL OR commanded gear		
					AND (stuck on enable cal for forward garge shifts	= 0(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	= 0(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		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 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	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	***************************** 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 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 > -999.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

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 (GF9 CB29) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,500.0 RPM > 450.0 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	> 1.000 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 P178F P17C6 P17C4 P17C7 P172A P172B		
					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 > 0.80 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 Stuck On Fail Offset Time 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	

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 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean	seconds	
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR	> -999 kPa		
					Park/Neutral Stuck on FP OR	= TRUE		
					Neutral Staging Line Pressure Disable)	= TRUE		
					****************************	*****************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 89.0 RPM		
					((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)	exhaust delay by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C2 off going clutch command pressure) (engine torque AND Primary oncoming stuck on torque enable cal)	 < 171 kPa > 8,192 Nm = 0 (0 is enable, 1 is enable)	shift type: closed throttle upshift: **C2 exhaust delay open throttle power on up shift** open throttle upshift: **C2 exhaust delay open throttle power on up shift** garage shifts: **C2 exhaust delay garage shift** closed throttle downshift: **C2 exhaust delay closed throttle down shift** negative torque upshift: **C2 exhaust delay negative torque up shift** open throttle downshift: **C2 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	 = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: **C1 Powered Upshift Tq Based Pres Clip** OR **C3 Powered Upshift Tq Based Pres Clip** OR **C4 Powered Upshift Tq Based Pres Clip** OR **C5 Powered Upshift Tq Based Pres Clip** OR **C6 Powered Upshift Tq Based Pres Clip** coasting downshift dependent on oncoming clutch: **C1 Coasting Downshift Tq Based Pres Clip** OR	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						C3 Coasting Downshift Tq Based Pres Clip OR **C4 Coasting Downshift Tq Based Pres Clip** OR **C5 Coasting Downshift Tq Based Pres Clip** OR **C6 Coasting Downshift Tq Based Pres Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C2 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND	# Garage shift		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state	**Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0(0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0(0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 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	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			procedure active	= FALSE Boolean		
		clutch to maintain full torque holding capacity			hydraulic pressure available	= TRUE		
		at the given engine crankshaft torque, to			(hydraulic pressure	> -999.00 kPa		
		maintain true gear			OR			
		ratio. When the clutch pressure control			Clutch Stuck on in Park/ Neutral fault pending	= TRUE		
		solenoid is failed			OR			
		hydraulically off, the clutch does not			Neutral Staging Line Pressure Disable)	= TRUE		
		maintain holding capacity at any engine			****************************	****************************		
		crankshaft torque, and the clutch slip speed is			enable C3 clutch slip speed fail compare when:			
		uncontrollable. The clutch pressure control			((startle mitigation active	= FALSE		
		solenoid test is			OR			
		suspended if the higher			(startle mitigation active	= TRUE		
		level safety startle			AND			
		mitigation function is active. The safety startle mitigation			startle mitigation gear)) (see startle mitigation active NOTE below)	# initial startle mitigation gear		
		function is triggered when a sudden vehicle deceleration occurs			unintended deceleration fault pending	= FALSE		
		due to a clutch			OR			
		pressure control solenoid that has failed in the opposite sense, clutch pressure control solenoid failed			unintended deceleration fault pending enable cal is FALSE (startle mitigation)	= 0 (0 to enable, 1 to disable)		
		hydraulically on, while the solenoid is electrically functional,			clutch steady state adaptive active	= FALSE		
		which must take priority over any clutch pressure control			(transmission output shaft speed	> 89.0 RPM		
		solenoid stuck off			OR			
		diagnostic monitor. All			accelerator pedal position	> 2.00 %		
		clutch pressure control			OR			

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 (GF9 CB38) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,500.0 RPM > 450.0 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	> 1.000 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 P178F P17C6 P17C4 P17C7 P172A P172B		
					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 < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.80 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 Stuck On Fail Offset Time 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	

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 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean	seconds	
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> -999 kPa =TRUE =TRUE		
					****************************	*****************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 89.0 RPM		
					((C3 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to	exhaust delay by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C3 off going clutch command pressure)	disable) < 115 kPa	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: **C3 exhaust delay garage shift** closed throttle downshift: **C3 exhaust delay closed throttle down shift** negative torque upshift: **C3 exhaust delay negative torque up shift** open throttle downshift: **C3 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: **C1 Powered Upshift Tq Based Pres Clip** OR **C2 Powered Upshift Tq Based Pres Clip** OR **C4 Powered Upshift Tq Based Pres Clip** OR **C5 Powered Upshift Tq Based Pres Clip** OR **C6 Powered Upshift Tq Based Pres Clip**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						coasting downshift dependent on oncoming clutch: **C1 Coasting Downshift Tq Based Pres Clip** OR **C2 Coasting Downshift Tq Based Pres Clip** OR **C4 Coasting Downshift Tq Based Pres Clip** OR **C5 Coasting Downshift Tq Based Pres Clip** OR **C6 Coasting Downshift Tq Based Pres Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C3 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					****************************** conditions needed to trigger test: (current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND 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	****************************** # Garage shift **Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0(0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0(0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					****************************** 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 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	P17C6 P17C4 P17C7 P172AP172B ******************************		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	< 0.2500 volts (< 0.5 Q impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P07C0 fault active service fast learn run crank voltage battery voltage P07BF fault active P07BF test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Input/Turbine Speed Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	> 4.7500 volts (< 0.5 Q impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P07BF fault active service fast learn run crank voltage battery voltage P07C0 fault active P07C0 test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE > 10.00 volts > 10.00 volts = FALSE = FALSE	fail time > 0.050 seconds, update fail count, fail count > 16 counts 6.25 millisecond update rate run crank and battery voltage time > 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5OR D6 OR D7 OR D8 OR D9 OR 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		
					D2 OR	= 1 Boolean		
					D3 OR	= 1 Boolean		
					D4 OR	= 1 Boolean		
					D5OR	= 1 Boolean		
					D6 OR	= 1 Boolean		
					D7 OR	= 1 Boolean		
					D8 OR	= 1 Boolean		
					D9 OR	= 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 D2 OR D3 OR D4 OR D5OR D6 OR D7 OR D8 OR D9 OR 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	= FALSE		
					P0826 test fail this key on	= FALSE		
					P0826 fault pending	= FALSE		
					(P0816 fault active OR	= FALSE		
					P0816 fault active test fail this key on)	= FALSE		
					PRNDL range change time	> 1.00 seconds		
					PRNDL in range:			
					D1 OR	= 1 Boolean		
					D2 OR	= 1 Boolean		
					D3 OR	= 1 Boolean		
					D4 OR	= 1 Boolean		
					D5OR	= 1 Boolean		
					D6 OR	= 1 Boolean		
					D7 OR	= 1 Boolean		
					D8 OR	= 1 Boolean		
					D9 OR	= 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.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 100 millisecond update rate	= illegal (voltage out of range)	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage P1761 fault active (P0826 fault active OR P0826 fault active test fail this key on)	= FALSE = 1 Boolean >5.00 volts >9.00 volts = FALSE = FALSE = FALSE	fail time > 60.00 seconds run crank voltage time > 25 milliseconds	Emissions Neutral Diagnostics - Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	> 200 K Q impedance between signal and controller ground	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 A Control Circuit Low	P0962	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 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 (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	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid B Control Circuit Low	P0966	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			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 (PC) Solenoid B Control Circuit High	P0967	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	>5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.30 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid C Control Circuit Low	P0970	Controller specific circuit diagnoses 9 speed CB38.10 speed C23457910, 8 speed C13567 clutch, 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 > 0.30 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 High	P0971	Controller specific circuit diagnoses 9 speed CB38, 10 speed C23457910, 8 speed C13567 clutch, or CVT line pressure solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage OR accessory voltage active OR Power Mode)	>5.00 volts = TRUE = ACCESSORY	> 25 milliseconds > 12.5 milliseconds	
					diagnostic monitor enable calibration	= 1 (1 is enable, 0 is disable)		
					(solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		
					OR			
					(solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	= CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Surge Solenoid Circuit Low	P171B	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a ground short circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short Increment fail time	< 0.5 Q impedance between signal and controller ground	battery voltage battery voltage battery enable time run/crank voltage run crank voltage time > diagnostic monitor enable	>9.00 volts < 32.00 volts > 1.00 seconds >5.00 volts 25 milliseconds = 1 Boolean	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.
Transmission Surge Solenoid Circuit High	P171C	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a short to voltage circuit fault 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 Increment fail time	< 0.5 Ω impedance between signal and controller voltage source	battery voltage battery voltage battery enable time run/crank voltage run crank voltage time diagnostic monitor enable	>9.00 volts < 32.00 volts > 1.00 seconds >5.00 volts time > 25 milliseconds = 1 Boolean	fail time > 0.100 seconds out of > 0.166 seconds sample time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Surge Accumulator System Performance	P171D	Detects when the surge accumulator 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 system.	Transmission turbine speed is greater than predicted turbine speed during autostart event, update initial fail count	**P171D predicted > turbine speed error** Refer to "Transmission Supporting Tables" for details	PRNDL state defaulted Transmission shift lever position Propulsion system active Ignition voltage Ignition voltage Transmission fluid temp Transmission fluid temp Hybrid state AutoStop duration min During autostop Engine speed was **************************** If above conditions are met then the following must occur: Turbine speed Engine speed Hydraulic pressure delay time If above conditions are met then increment time-out timer. Time-out timer Note: The initial fail	= False = Forward range A = True > 9.00 volts < 31.99 volts > 0.00 °C < 110.00 °C = Engine off > 1.200 seconds < 5.0 RPM > 80.0 RPM > 450.0 RPM **P171D hydraulic > pressure delay** Refer to "Transmission Supporting Tables" for details < 0.38 seconds	> 8 counts (initial fail count) Frequency =12.5ms Once the above counts are achieved then increment the final fail counter once. The final fail counter can only increment once per autostart event > 3 counts (final fail counter) If above counter is greater than threshold then report DTC failed. Frequency = 12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					counter must achieve it's fail threshold in less than the time-out time.			
					****************************			
					If vehicle is launched then:			
					Transmission gear ratio	= 4.689 1st gear ratio = 3.306 2nd gear ratio = 3.012 3rd gear ratio = 2.446 4th gear ratio = 1.923 5th gear ratio = 1.446 6th gear ratio		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 will return to near zero rpm. ******************************			
					DTCs not fault active	CrankSensor_FA Transmission Output Shaft Angular Velocity Validity Transmission Turbine Angular Velocity Validity Transmission Oil Temperature Validity P171A P171B P171C U0101 P182E P1915		

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 battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	> 500.0 RPM > **engine speed time for transmission hydraulic pressure available** >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Control System - Shift Limiting Active	P175E	The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time # 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault DTCs and performance fault DTCs. The latent fault diagnostic monitor	unintended decel test system fault unintended decel test system fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND unintended deceleration latent fault fail count)) UPDATE unintended decel test system fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE continue execute only IF: calibrated for a back up signal to longitudinal acceleration and total brake axle torque using and wheel speed or TOSS OR U0121 (loss comm ABS/EBCM) occurs OR brake pedal position fault THEN SET unintended decel test system fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = CeTSDD_e_WhlSpdBackUp	unintended decel test system fault time > 10.0 seconds UPDATE unintended deceleration latent fault fail count SET unintended decel test system fault = TRUE unintended deceleration latent fault fail count > 100 counts 25 millisecond update rate	Type A, 1 Trips
			ECM range sensor fault ECM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria	= 0 Boolean > 5.00 volts > 12.5 milliseconds = FALSE	ECM range sensor fault time > 10.0 seconds UPDATE ECM range sensor latent fault fail count SET ECM range sensor fault = TRUE	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	AND ECM range sensor latent fault fail count)) UPDATE ECM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= 200 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 > 200 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 = 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 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 > 10.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count > 200 counts 25 millisecond update rate	
			TOSS fault TOSS fault occur RunCrankVoltageMet (default gear option	= FALSE = TRUE = TRUE = FALSE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage	= 1 Boolean > 5.00 volts	TOSS fault time > 10.0 seconds UPDATE TOSS latent fault fail count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			active OR (*default gear option active AND TOSS sensor latent fault fail count)) UPDATE TOSS fault time *default gear option active occurs when emission MIL active due to transmission default gear	 = TRUE = 100 counts	for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on SET TOSS fault occur = TRUE	> 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	SET TOSS fault = TRUE TOSS latent fault fail count > 100 counts 25 millisecond update rate	
			tie-up fault tie-up fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE tie-up fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF P077C or P077D fault active OR P0722 or P0723 test fail this key on	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	tie-up fault time > 10.0 seconds UPDATE tie-up latent fault fail count SET tie-up fault = TRUE tie-up latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					SET tie-up fault occur = TRUE			
			trans range fault trans range fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up latent fault fail count)) UPDATE trans range fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 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 [(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 > 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.
					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 = 1 Boolean = 0 Boolean = TRUE = TRUE = 1 Boolean = 0 Boolean		
			tie-up test disable fault tie-up test disable fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND tie-up test latent fault fail count)) UPDATE tie-up test latent fault time *default gear option active	= FALSE = TRUE = TRUE = FALSE = TRUE = 100 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds	tie-up test latent fault time > 10.0 seconds UPDATE tie-up test latent fault fail count SET tie-up test disable fault = TRUE tie-up test latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			occurs when emission MIL active due to transmission default gear		IF EngineTorqueEstInaccurate AcceleratorPedalFailure OR CrankSensor_FA OR P2534 fault active OR (P0707 test fail this key on OR P0707 fault active OR P0708 test fail this key on OR P0708 fault active OR P2805 fault active OR P27EE fault active OR P27EB fault active OR P27ED fault active OR P17F7 fault active OR P17F5 fault active OR P17F6 fault active OR P17FC fault active OR P17FA fault active OR P17FB fault active) OR (P0716 fault pending, fault active, test fail this key on OR P0717 fault pending, fault active, test fail this key on OR P0721 fault pending, fault active, test fail this key on OR P0722 fault pending, fault active, test fail this key on OR P0723 fault pending, fault active, test fail this key on OR P077B fault oendinq, fault	= TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					active, test fail this key on 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	> 25.0 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_SingleSpdSnsr **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 ****************************** > 172.0 RPM > 89.0 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.
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.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 1.00 seconds		
			(intermediate speed sensor 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	**speed sensor directional rationality** **= enable calibration** = CeTOSR_e_Directional > 500.0 RPM > **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw 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 1 Direction Not Plausible - Reverse	P17C4	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.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	> 1.00 seconds		
			(intermediate speed sensor 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	**speed sensor directional rationality = enable calibration** = CeTOSR_e_Directional > 500.0 RPM > **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					range shift state (auto trans shift complete) enable time	> 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw 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 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_SinglеSpdSnsr > 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 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 >8.00 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 >8.00 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 >8.00 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 >8.00 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 >8.00 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 >8.00 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	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.	ETRS commanded direction AND	# PARK	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description)	= TRUE	fail count > 2.00 counts	Type A, 1 Trips
			Diagnostic Park State (see diagnostic park state definition) AND	= PARK			update rate 6.25 milliseconds	
					diagnostic monitor enable	= 1.00 Boolean		
			Park Servo Position	= PARK	High Side Driver 1	= TRUE		
					High Side Driver 2	= TRUE		
			delay time AND	> **Park Valve Stk On Dly Lim**	park servo stuck on available (see park servo stuck on definition)	= TRUE		
			fail time	>= **Park Valve Stk On Fail Lim**	(Mode Valve A command pressure AND	> 195.00		
			increment fail count		(((mode valve A state attained AND	= TRUE		
					STGRMode VlvA Position AND	= HIGH		
					P27EC Test Fail This Key On) OR	= TRUE		
					(Mode Valve A Position AND	= HIGH		
					P27EC Test Fail This Key On)) OR	= FALSE		
					Mode Valve A Snsr FP)) OR	= TRUE		
					(Mode Valve B command pressure AND	> 295.00		
					(((mode valve B state attained AND	= TRUE		
					STGR Mode Vlv B Position AND	= HIGH		
					P27EC Test Fail This Key On) OR	= TRUE		
					(Mode Valve B Position AND	= HIGH		
					P27EC Test Fail This Key On)) OR	= FALSE		
					Mode Valve B Snsr FP))	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					((P17F5, P17F6, P17F7 Fault Active AND P18E7Test Fail This Key On) OR (P17FA, P17FB, P17FC Fault Active AND P18E8Test Fail This Key On)) AND P187D, P187ETest Fail This Key On	= FALSE = FALSE = FALSE = FALSE = FALSE		
			ETRS commanded direction AND Diagnostic Park State (see diagnostic park state definition) AND Park Servo Position delay time AND fail time increment fail count	# PARK = OUT OF PARK # OUT OF PARK > **Park Valve Stk On Dly Lim** >= **Park Valve Stk On Fail Lim**	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2 ((ETRS Hydraulic Pressure Avail (see ETRS Hydraulic Pressure Avail description) OR (ETRS commanded direction AND PISA Fail Count (Mode Valve A position OR Mode Valve B position))) ((P17F5, P17F6, P17F7 Fault Active AND P18E7Test Fail This Key On AND Park Position Sensor A) AND (P17FA, P17FB, P17FC Fault Active AND P18E8Test Fail This Key On AND	= TRUE = 1.00 Boolean = TRUE = TRUE = TRUE = NeutLo = 0 # LOW # LOW = FALSE = FALSE # OUT OF PARK = FALSE = FALSE	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.
					Park Position Sensor B)) AND P187D, P187ETest Fail This Key On	# OUT OF PARK = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Park Valve Stuck Off	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.	ETRS commanded direction Diagnostic Park State (see diagnostic park state description) Park Servo Position IF ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) (IF 0 line pressure command Delay Limit ELSE Delay Limit) ELSE (IF (High Side Driver 1 High Side Driver 2 Line pressure control in use) Delay Limit ELSE Delay Limit)	= PARK = PARK # PARK = TRUE = TRUE = **Park Vlv Stk Off ZL DLy Lim** = **Park Vlv Stk Off Dly Lim** = TRUE = TRUE # Diag Max Pressure = **Park Vlv Stk Off Eng Off Lim** = **Park Vlv Stk Off ML Eng Off Lim**	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2 (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) OR ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avil description) AND Power Mode Prev to ACC) IF (P18E7Test Fail This Key On AND Park Position Sensor A FPAND P17F5, P17F6, P17F7 Fault Active AND Park Position Sensor A) ELSE (P18E7Test Fail This Key On OR Park Position Sensor A FPOR P17F5, P17F6, P17F7 Fault Active) ((P17F5, P17F6, P17F7 Fault Active AND P18E7Test Fail This Key On) OR (P17FA, P17FB, P17FC Fault Active AND	= TRUE = 1.00 = TRUE = TRUE = TRUE = FALSE # OFF = FALSE = FALSE =FALSE # PARK = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE	Delay Time > Delay Limit Increment fail time fail time > **Park Valve Stuck Off Fail Lim** Increment fail counter Fail counter > 2.00 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.
					P18E8Test Fail This Key On)) AND P187D, P187ETest Fail This Key On	= FALSE = FALSE		
			ETRS commanded direction Diagnostic Park State (see diagnostic park state description) Park Servo Position Park Position Sensor A IF ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) (IF 0 line pressure command Delay Limit ELSE Delay Limit) ELSE IF (High Side Driver 1 High Side Driver 2 Line pressure control in use) Delay Limit ELSE Delay Limit	# PARK = PARK # OUT OF PARK = OUT OF PARK = TRUE = TRUE = **Park Vlv Stk Off ZL DLy Lim** = **Park Vlv Stk Off Dly Lim** = TRUE = TRUE # Diag Max Pressure = **Park Vlv Stk Off Eng Off Lim** = **Park Vlv Stk Off ML Eng Off Lim**	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2 IF P18E7Test Fail This Key On AND Park Position Sensor A FPAND P17F5, P17F6, P17F7 Fault Active AND Park Position Sensor A ((P17F5, P17F6, P17F7 Fault Active AND P18E7Test Fail This Key On) OR (P17FA, P17FB, P17FC Fault Active AND P18E8Test Fail This Key On)) AND P187D, P187ETest Fail This Key On	= TRUE = 1.00 = TRUE = TRUE = FALSE = FALSE =FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	Delay Time > Delay Limit Increment fail time fail time > **Park Valve Stuck Off Fail Lim** Increment fail counter Fail counter > 2.00 update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ETRS commanded direction	= PARK	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description)	= TRUE	Delay Time > Delay Limit	
			Diagnostic Park State (see diagnostic park state description)	= OUT OF PARK			Increment fail time	
					diagnostic monitor enable	= 1.00		
			Park Servo Position	# PARK	High Side Driver 1	= TRUE		
					High Side Driver 2	= TRUE	fail time > **Park Valve Stuck Off Fail Lim**	
			IF		IF			
			ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)	= TRUE	((((Mode Valve A state attained Or	= TRUE		
					Mode Valve A sensor FP OR	= TRUE	Increment fail counter	
			(IF		P18ABTest Fail This Key On OR	= TRUE		
			0 line pressure command	= TRUE			Fail counter > 2.00	
			Delay Limit	=	P27EC Test Fail This Key On) &&	= TRUE		
			ELSE	**Park Vlv Stk Off ZL DLy Lim**	Mode Valve A commanded pressure)	< 195.00	update rate 6.25 milliseconds	
			Delay Limit)	= **Park Vlv Stk Off Dly Lim**	OR			
			ELSE		((Mode Valve B state attained Or	= TRUE		
					Mode Valve B sensor FP OR	= TRUE		
			(IF					
			(High Side Driver 1	= TRUE	P18ACTest Fail This Key On OR	= TRUE		
			High Side Driver 2	= TRUE				
			Line pressure control in use)	# Diag Max Pressure	P27F0 Test Fail This Key On) &&	= TRUE		
			Delay Limit	=	Mode Valve B commanded pressure)))	< 295.00		
			ELSE	**Park Vlv Stk Off Eng Off Lim**	OR			
			Delay Limit)	= **Park Vlv Stk Off ML Eng Off Lim**	0 line pressure command	= TRUE		
					((P17F5, P17F6, P17F7 Fault Active AND	= FALSE		
					P18E7Test Fail This Key On) OR	= FALSE		
					(P17FA, P17FB, P17FC Fault Active AND	= FALSE		
					D'IQCQ T7 + C il Tkin IZ™,	- false		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					On)) AND P187D, P187ETest Fail This Key On	= FALSE		

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 (P189C fault active OR P189C test fail this key on) range change delay when P189C fault pending time, update P189C fail time service mode $04 active run/crank voltage run/crank voltage time	= 1 Boolean = FALSE = FALSE > 3,000 milliseconds > 5 milliseconds = FALSE >5.00 volts > 3,000 milliseconds	P189C fail time > 375 milliseconds	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 Inhibit Actuator Control Circuit Low	P18A2	Controller specific circuit diagnoses internal ETRS park solenoid for an ground short or open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an short to ground circuit	> 200 K Q impedance between signal and controller ground Increment open fail time OR < 0.5 Q impedance between signal and controller ground Increment low fail time	battery voltage run crank voltage OR accessory voltage active (open test (solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR open test (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on)) (low test (solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR low test (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on)) solenoid open failure mapped to low DTC	> 9.00 volts and < 32.00 volts >5.00 volts = TRUE = CeTSCR_e_HSD2 = CeTSCR_e_HSD2 = CeTSCR_e_HSD2 = CeTSCR_e_HSD2 see "P18A2 open failure enable"	> 1.000 seconds 25 milliseconds 12.5 milliseconds open fail time> 0.100 seconds out of open	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					enable calibration solenoid low failure mapped to low DTC enable calibration	= 0 Boolean see "P18A2 low failure enable" = 1 Boolean	samle time > 0.166 seconds low fail time > 0.100 seconds out of low samle time > 0.166 seconds fail timer in sample time window reaching open OR low fail thresholds will set DTC	

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 ((solenoid is mapped to high side driver 1 (= CeTSCR_e_HSD1) AND high side driver 1 on) OR open test (solenoid is mapped to high side driver 2 (= CeTSCR_e_HSD2) AND high side driver 2 on)) solenoid open failure mapped to low DTC enable calibration	> 9.00 volts and < 32.00 volts >5.00 volts = TRUE = CeTSCR_e_HSD2 = CeTSCR_e_HSD2 see "P18A4 high failure enable" = 1 Boolean	> 1.000 seconds 25 milliseconds 12.5 milliseconds fail time> 0.100 seconds out of sarnie time > 0.166 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	P18A8	This diagnostic monitor rationalizes the park inhibit solenoid based on the driver ETRS command direction and mode valve states.	((ETRS Command Direction OR ETRS Hydraulic Pressurse Avail (see ETRS hydraulic pressure avail description)) AND Diagnostic Park State (see diagnostic park state definition) AND Park Servo Position) IF (Mode Valve A position Mode Valve B position Park position sensor A Park position sensor B) ELSE IF (PISA Fail Counter Park Servo Position Prev Park Servo Position Park Position Sensor B) SET PISA Stk Off Fault Pending = TRUE IF ETRS Hydraulic Pressurse Avail (see ETRS hydraulic pressure avail description) Fail Count Lim ELSE Fail Count Lim IF PISA Stk Off Fault Pending AND	= NeutLo = FALSE = OUT OF PARK # OUT OF PARK = LOW = LOW = PARK = PARK > 0 = OUT OF PARK # OUT OF PARK = PARK = TRUE = 3.00 = 3.00 = TRUE	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) diagnostic monitor enable High Side Driver 1 High Side Driver 2 P18A8Test Fail This Key On AND (P187E, P187DTest Fail This Key On) AND AND (P18A2, P18A3, P18A4 Fault Active) AND (P17F5, P17F6, P17F7 Fault Active) AND (P17FA, P17FB, P17FC Fault Active) AND (P27EC, P27F0 Test Fail This Key On)	= TRUE = 1.00 = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	PISA Fail Counter > Fail Count Lim 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.
			PISA Stk Off Fault Pending Increment PISA Fail Counter SET PISA Stk Off Fault Pending = FALSE	= FALSE				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control Valve A Stuck On	P18AA	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "on" or "high" state, which is in error, when commanded hydraulic pressure in the circuit used to move the mode valve is not sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “off’ or “low” state.	Mode Valve A Position IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion) IF (Mode Valve A Trnstn Fault Pending AND Mode Valve A St Fnl Fault Pending) MVA Fail Limit ELSE IF (Mode Valve A Trnstn Fault Pending) MVA Fail Limit ELSE IF (Mode Valve A St Fnl Fault Pending) MVA Fail Limit ELSE	# LOW = TRUE = FALSE = FALSE = **Mode Valve A Fail Lim** = TRUE = ModeVlvA_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift) = TRUE = ModeVlvA_FnlDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)ModeVlvlA_	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) Auto-Stop Active High Side Driver 1 High Side Driver 2 ETRS commanded direction ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AFTest Fail This Key On IF ((((Mode Valve A St Attnd (see mode valve A st attnd description) AND Mode Valve A Trnstn (see mode valve A trnstn description))AND (Diagnostic Range OR Mode Valve B Trnstn (see	= TRUE = TRUE = FALSE = TRUE = TRUE # ETRS diagnostic range = Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = NeutShf = TRUE	When: ((Park is commanded AND fail count >= 2.00) OR (Park is not commanded AND fail count >= 2.00)) update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			IF (High Side Driver 1 AND High Side Driver 2 AND Line pressure Command) MVA Fail Limit ELSE MVA Fail Limit Increment MVA Fail Timer IF (MVA Fail Timer IF (Mode Valve A Trnstn (see mode valve A trnstn description) Set Mode Valve A St Fnl Fault Pending) ELSE (Set Mode Valve A Trnstn Fault Pending)) Increment fail counter Set MVA Fail Timer = 0	= TRUE = TRUE # Diag Max Press = **Mode Valve A Eng Off Dly Lim** = **Mode Valve A Eng Off ML Lim** > MVA Fail Limit = TRUE = TRUE = TRUE **ModeVlvA_TrnstnDly [ETRS attained range Drive, ETRS command range NeutHi]**	mode valve B trnstn description) OR Mode Valve B St Attnd (see mode valve B st attnd description) OR (0 line pressure command AND Mode Valve A Position))) IF Diagnostic Enable AND Mode Valve A pressure command ((ETRS commanded direction AND ETRS diagnostic range AND 0 line pressure command) OR (ETRS commanded direction AND ETRS diagnostic range AND line pressure command) Increment Delay Timer Delay Limit Delay Timer Set Mode Valve A sensor Fault Pending IF	= TRUE = TRUE = HIGH = 1.00 < 25.00 # Drive or NeutShf or Park = Drive or NeutShf # TRUE = NeutShf = Drive = 0 = ModeVlvA_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvA_TrnstnDly	(Mode Valve A sensor	= TRUE		
				[ETRS attained range	Fault Pending AND			
				Drive, ETRS	(ETRS Commanded	= PARK		
				command range	Dirctn AND			
				NeutLo]	(Park Servo Position OR	# PARK		
				ModeVlvA_TrnstnDly	0 line pressure	= TRUE		
				[ETRS attained range	command)) OR			
				Drive, ETRS	ETRS Commanded	= Reverse, NeutLo,		
				command range	Dirctn))	NeutHi, or NeutShf		
				NeutShf]				
				ModeVlvA_TrnstnDly	Execute Mode Valve A			
				[ETRS attained range	Fail			
				Drive, ETRS				
				command range	ELSE			
				Park]				
				ModeVlvA_TrnstnDly	IF			
				[ETRS attained range	(Mode Valve A Trnstn (see	= TRUE		
				NeutShf, ETRS	mode valve A trnstn			
				command range	description) AND			
				NeutHi]	(Mode Valve B Trnstn	= TRUE		
				ModeVlvA_TrnstnDly	9see mode valve B trnstn			
				[ETRS attained range	description) OR			
				NeutShf, ETRS	Mode Valve B St Attnd	= TRUE		
				command range	(see mode valve B st			
				NeutLo]	attnd description) OR			
				ModeVlvA_TrnstnDly	P27F0 Fault Active OR	= TRUE		
				[ETRS attained range	Mode Valve B sensor	= TRUE		
				NeutShf, ETRS	Fault Pending)			
				command range				
				Park]	IF			
				ModeVlvA_TrnstnDly	((ETRS Commanded	= NeutLo		
				[ETRS attained range	Dirctn (see ETRS			
				NeutShf, ETRS	commanded direction)			
				command range	AND			
				Reverse]	Mode Valve A pressure)	< 195.00		
				ModeVlvA_FnlDly	OR			
				[ETRS attained range	(ETRS Commanded	# Drive		
				Park, ETRS	Dirctn AND Mode Enbl	= TRUE		
				command range	Brk Drv Ltch (see Mode			
				NeutLo]	Enbl brk drv ltch			
					description) AND			
					Mode Valve A pressure)	> 195.00		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvA_TrnstnDly	OR			
				[ETRS attained range	ETRS Commanded Dirctn	= Drive		
				NeutHi, ETRS	AND			
				command range NeutLo]	Mode Valve A pressure	> 195.00		
				ModeVlvA_TrnstnDly [ETRS attained range NeutHi, ETRS command range Park] ModeVlvA_TrnstnDly [ETRS attained range NeutHi, ETRS	Delay Limit	= ModeVlvA_FnlDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift)		
				command range Reverse]	Increment Delay Timer			
				ModeVlvA_TrnstnDly [ETRS attained range	Delay Timer	> Delay Limit		
				NeutLo, ETRS command range NeutHi]	Set Mode Valve A sensor Fault Pending			
				ModeVlvA_TrnstnDly [ETRS attained range NeutLo, ETRS	Execute Mode Valve A Fail			
				command range Park]	P18AATest Fail This Key On	= FALSE		
				ModeVlvA_TrnstnDly	P27EB Fault Active	= FALSE		
				[ETRS attained range	P27ED Fault Active	= FALSE		
				NeutLo, ETRS	P27EE Fault Active	= FALSE		
				command range Reverse]	P18ABTest Fail This Key On	= FALSE		
				ModeVlvA_TrnstnDly [ETRS attained range Park, ETRS command range NeutHi] ModeVlvA_TrnstnDly [ETRS attained range Park, ETRS command range Reverse]	P27EC Test Fail This Key On	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvA_TrnstnDly [ETRS attained range Reverse, ETRS command range NeutHi] ModeVlvA_TrnstnDly [ETRS attained range Reverse, ETRS command range NeutLo] ModeVlvA_TrnstnDly [ETRS attained range Reverse, ETRS command range Park] ModeVlvA_FnlDly [ETRS attained range Drive, ETRS command range NeutHi] ModeVlvA_FnlDly [ETRS attained range Drive, ETRS command range NeutLo] ModeVlvA_FnlDly [ETRS attained range Drive, ETRS command range NeutShf] ModeVlvA_FnlDly [ETRS attained range Drive, ETRS command range Park] ModeVlvA_FnlDly [ETRS attained range Drive, ETRS command range Reverse]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvA_FnlDly [ETRS attained range NeutHi, ETRS command range Drive] ModeVlvA_FnlDly [ETRS attained range NeutHi, ETRS command range NeutLo] ModeVlvA_FnlDly [ETRS attained range NeutHi, ETRS command range NeutShf] ModeVlvA_FnlDly [ETRS attained range NeutHi, ETRS command range Park] ModeVlvA_FnlDly [ETRS attained range NeutHi, ETRS command range Reverse] ModeVlvA_FnlDly [ETRS attained range NeutLo, ETRS command range Drive] ModeVlvA_FnlDly [ETRS attained range NeutLo, ETRS command range NeutHi] ModeVlvA_FnlDly [ETRS attained range NeutLo, ETRS command range NeutShf]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvA_FnlDly [ETRS attained range NeutLo, ETRS command range Park] ModeVlvA_FnlDly [ETRS attained range NeutLo, ETRS command range Reverse] ModeVlvA_FnlDly [ETRS attained range NeutShf, ETRS command range Drive] ModeVlvA_FnlDly [ETRS attained range NeutShf, ETRS command range NeutHi] ModeVlvA_FnlDly [ETRS attained range NeutShf, ETRS command range NeutLo] ModeVlvB_FnlDly [ETRS attained range NeutShf, ETRS command range Park] ModeVlvB_FnlDly [ETRS attained range NeutShf, ETRS command range Reverse] ModeVlvA_FnlDly [ETRS attained range Park, ETRS command range Drive]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvA_FnlDly [ETRS attained range Park, ETRS command range NeutHi] ModeVlvA_FnlDly [ETRS attained range Park, ETRS command range NeutShf] ModeVlvA_FnlDly [ETRS attained range Park, ETRS command range Reverse] ModeVlvA_FnlDly [ETRS attained range Reverse, ETRS command range Drive] ModeVlvA_FnlDly [ETRS attained range Reverse, ETRS command range NeutHi] ModeVlvA_FnlDly [ETRS attained range Reverse, ETRS command range NeutLo] ModeVlvA_FnlDly [ETRS attained range Reverse, ETRS command range NeutShf] ModeVlvA_TrnstnDly [ETRS attained range Reverse, ETRS command range Park]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Mode Valve A Position	# LOW	ETRS Performance Diag Enabl (see ETRS performance diag enabl description)	= TRUE	MVA Fail Timer > MVA Fail Limit	
			ETRS commanded direction AND	# Drive or NeutShf				
			mode valve A pressure	<= 25.00	ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)	= TRUE	update rate 6.25 milleseconds	
			IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion)	= TRUE	ETRS commanded direction	= ETRS diagnostic range		
			IF (Mode Valve A Trnstn Fault Pending AND	= FALSE	P18AATest Fail This Key On	= FALSE		
			Mode Valve A St Fnl Fault Pending)	= FALSE	P27EB Fault Active	= FALSE		
					P27ED Fault Active	= FALSE		
					P27EE Fault Active	= FALSE		
					P18ABTest Fail This Key On	= FALSE		
			MVA Fail Limit	= **Mode Valve A Fail Lim**	P27EC Test Fail This Key On	= FALSE		
			Increment MVA Fail Timer					
					IF (Mode Valve A Position OR	≠ **Mode Valve A Final State**		
					Mode Valve A Position)	# Mode Valve A Command		
					Increment Steady State Delay			
					Steady State Delay	> **Mode Vlv StdySt Park Dly Lim**		
					IF (ETRS Commanded Dirctn	= PARK		
					IF (Park Servo State OR	# PARK		
					Line Pressure OR	< 450.00		
					Line Pressure Control))	= Diag Min Press		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control) Execute Fail ELSE Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Fail	 = NeutLo = PARK < 450.00 = Diag Min Press = DRIVE || REVERSE = PARK > 450.00 # Diag Min Press > **ETRS Mode Valve A turbine delay** = Slip Detected		
			Mode Valve A Position ETRS command direction AND mode valve A pressure	# LOW # NeutShf < 195.00	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic	= TRUE = FALSE	IF Mode Valve A Engine Off Fault Pending = TRUE Increment MVA	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			IF ((High Side Driver 1 AND High Side Driver 2 AND Line Pressure Control) MVA engine off delay lim AND MVA engine off fail lim) ELSE MVA engine off delay lim AND MVA engine off fail lim Increment MVA engine off delay MVA engine off delay Set Mode Valve A Engine Off Fault Pending	= TRUE = TRUE # Diag Max Pres = **Mode Valve A Eng Off Dly Lim** = **Mode Valve A Eng Off ML Lim** > MVA engine off delay lim = TRUE	pressure avail description) AND (hydraulic system pressure available OR auto stop active) GF9 engine off diagnsotic enable P18AATest Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active	= FALSE = TRUE = 1.00 Boolean = FALSE = FALSE = FALSE = FALSE	engine off fail timer MVA engine off fail timer > MVA engine off fail lime update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control Valve A Stuck Off	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.	Mode Valve A Position ETRS commanded direction AND mode valve A pressure IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion) IF (Mode Valve A Trnstn Fault Pending AND Mode Valve A St Fnl Fault Pending) MVA Fail Limit Increment MVA Fail Timer	# HIGH = Drive OR NeutShf > 195.00 = TRUE = FALSE = FALSE = **Mode Valve A Fail Lim**	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18AA Test Fail This Key On P27EB Fault Active AND P27ED Fault Active AND P27EE Fault Active AND P18AB Test Fail This Key On AND P27EC Test Fail This Key On IF (Mode Valve A Position OR Mode Valve A Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn) Execute Fail ELSE IF (ETRS Commanded Dirctn	= TRUE = TRUE = ETRS diagnostic range = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **Mode Valve A Final State** # Mode Valve A Command > **Mode Vlv StdySt Park Dly Lim** = NeutShf = NeutLo	MVA Fail Timer > MVA Fail Limit update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control) Execute Fail ELSE Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Fail	= PARK < 450.00 = Diag Min Press = DRIVE || REVERSE = PARK > 450.00 # Diag Min Press > **ETRS Mode Valve A turbine delay** = Slip Detected		
			Mode Valve A Position IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion) IF (Mode Valve A Trnstn Fault Pending AND	# HIGH = TRUE = FALSE	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) Auto-Stop Active High Side Driver 1 High Side Driver 2	= TRUE = TRUE = FALSE = TRUE = TRUE	fail count > 2.00 update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Mode Valve A St Fnl Fault Pending) MVA Fail Limit ELSE IF (Mode Valve A Trnstn Fault Pending) MVA Fail Limit ELSE IF (Mode Valve A St Fnl Fault Pending) MVA Fail Limit ELSE IF (High Side Driver 1 AND High Side Driver 2 AND Line pressure Command) MVA Fail Limit ELSE MVA Fail Limit	= FALSE = **Mode Valve A Fail Lim** = TRUE = ModeVlvA_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift) = TRUE = ModeVlvA_FnlDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)ModeVlvlA_ = TRUE = TRUE # Diag Max Press = **Mode Valve A Eng Off Dly Lim** =	ETRS commanded direction ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AFTest Fail This Key On IF (((Mode Valve A St Attnd (see mode valve A st attnd description) AND Mode Valve A Trnstn (see mode valve A trnstn description))AND (Diagnostic Range OR Mode Valve B Trnstn (see mode valve B trnstn description) OR Mode Valve B St Attnd (see mode valve B st attnd description) OR (0 line pressure command AND Mode Valve A Position))) IF	# ETRS diagnostic range = Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = NeutShf = TRUE = TRUE = TRUE = HIGH		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				Mode Valve A Eng Off MLLim	Diagnostic Enable AND	= 1.00		
			Increment MVA Fail Timer		Mode Valve A pressure command	> 195.00		
			IF					
			(MVA Fail Timer	> MVA Fail Limit	((ETRS commanded direction OR	= Drive or NeutShf		
			IF		(ETRS Commanded Dirctn AND	= NeutLo		
			(Mode Valve A Trnstn (see mode valve A trnstn description)	= TRUE	ETRS diagnostic range) AND	= Park		
			Set Mode Valve A St Fnl Fault Pending)	= TRUE	0 line pressure command)	= FALSE		
			ELSE		Increment Delay Timer			
					Delay Limit	= ModeVlvA_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift)		
			(Set Mode Valve A Trnstn Fault Pending))	= TRUE				
			Increment fail counter					
			Set MVA Fail Timer = 0					
					Delay Timer	> Delay Limit		
				ModeVlvA_TrnstnDly [ETRS attained range Drive, ETRS command range NeutShf]	Set Mode Valve A sensor Fault Pending	= TRUE		
					IF			
					(Mode Valve A sensor Fault Pending	= TRUE		
				ModeVlvA_TrnstnDly [ETRS attained range NeutHi, ETRS command range Drive]	IF			
					(ETRS Commanded Dirctn AND	= Drive		
				ModeVlvA_TrnstnDly [ETRS attained range NeutHi, ETRS command range NeutShf]	ETRS Diagnostic Range)	# Park		
					Execute Mode Valve A Fail			
					IF			
					(ETRS Commanded Dirctn AND	= Drive or NeutLo		
					ETRS Diagnostics Range	= Park		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvA_TrnstnDly [ETRS attained range NeutLo, ETRS command range Drive] ModeVlvA_TrnstnDly [ETRS attained range NeutLo, ETRS command range NeutShf] ModeVlvA_TrnstnDly [ETRS attained range NeutShf, ETRS command range Drive] ModeVlvA_TrnstnDly [ETRS attained range Park, ETRS command range Drive] ModeVlvA_TrnstnDly [ETRS attained range Park, ETRS command range NeutLo] ModeVlvA_TrnstnDly [ETRS attained range Reverse, ETRS command range Drive] ModeVlvA_TrnstnDly [ETRS attained range Reverse, ETRS command range NeutShf]	AND Park Servo Position) Execute Mode Valve A Fail IF (ETRS Commanded Dirctn) Execute Mode Valve A Fail) P18AATest Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18ABTest Fail This Key On P27EC Test Fail This Key On	 = PARK = NeutShf = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control Valve B Stuck On	P18AC	This diagnostic monitor detects a Mode Valve B Position Sensor State in the "on" or "high" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is not sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “off” or “low” state.	Mode Valve B Position ETRS commanded direction AND mode valve B pressure IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion) IF (Mode Valve B Trnstn Fault Pending AND Mode Valve B St Fnl Fault Pending) MVB Fail Limit Increment MVA Fail Timer	# LOW = Drive, NeutLo, Park <= 25.00 = TRUE = FALSE = FALSE = **Mode Valve B Fail Lim**	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18ACTest Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18ADTest Fail This Key On P27F0 Test Fail This Key On IF (Mode Valve B Position OR Mode Valve B Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control))	= TRUE = TRUE = ETRS diagnostic range = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **Mode Valve B Final State** # Mode Valve B Command > **Mode Vlv StdySt Park Dly Lim** = PARK # PARK < 450.00 = Diag Min Press	MVB Fail Timer > MVB Fail Limit update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control) Execute Fail ELSE Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Fail	 = NeutLo = PARK < 450.00 = Diag Min Press = DRIVE || REVERSE = PARK > 450.00 # Diag Min Press > **ETRS Mode Valve B turbine delay** = Slip Detected		
			Mode Valve A Position IF (ETRS Hydraulic	# LOW = TRUE	ETRS Performance Diag Enabl (see ETRS performance diag enabl description)	= TRUE	When: ((Park is commanded AND	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Pressure Avail (see ETRS		ETRS Hydraulic Pressure	= TRUE	fail count >=	
			hydraulic pressure avail		Avail (see ETRS hydraulic		2.00)	
			descritpion)		pressure avail description)		OR	
					Auto-Stop Active	= FALSE	(Park is not	
			IF		High Side Driver 1	= TRUE	commanded	
			(Mode Valve B Trnstn	= FALSE	High Side Driver 2	= TRUE	AND	
			Fault Pending AND				fail count >=	
			Mode Valve A St Fnl Fault	= FALSE	ETRS commanded	# ETRS diagnostic range	2.00 transition	
			Pending)		direction		fail >	
			MVB Fail Limit	=	((Driver command	= Park	update rate 6.25	
				Mode Valve B Fail	P2812 Fault Active	= FALSE	milleseconds	
				Lim	P2815 Fault Active	= FALSE		
			ELSE IF		P0970 Fault Active	= FALSE		
			(Mode Valve B Trnstn	= TRUE	P2720 Fault Active)	= FALSE		
			Fault Pending)		OR			
					(Driver command	# Park		
			MVB Fail Limit	= ModeVlvB_TrnstnDly	P2814 Fault Active	= FALSE		
				[ETRS diagnostic	(P0968 Fault Active	= FALSE		
				range][ETRS	P0971 Fault Active)	= FALSE		
				commanded direction]	OR			
				(see supporting tables	(P2718 Fault Active	= FALSE		
				for specific delay	P2721 Fault Active)))	= FALSE		
				associated with each				
				shift)	Mode Enbl Vlv Stk On	= FALSE		
			ELSE IF		Test			
			(Mode Valve B St Fnl	= TRUE				
			Fault Pending)		P18AFTest Fail This Key	= FALSE		
					On			
			MVB Fail Limit	= ModeVlvB_FnlDly				
				[ETRS diagnostic	IF			
				range][ETRS	((((Mode Valve B St Attnd	= FALSE		
				commanded direction]	(see mode valve B st			
				(see supporting tables	attnd description) AND			
				for specific delay	Mode Valve B Trnstn (see	= FALSE		
				associated with each	mode valve B trnstn			
				shift)ModeVlvlA_	description))AND			
			ELSE		(Diagnostic Range OR	= NeutShf		
					Mode Valve A Trnstn (see	= TRUE		
			IF		mode valve A trnstn			
			(High Side Driver 1 AND	= TRUE	description) OR			
			Hiqh Side Driver 2 AND	= TRUE	Mode Valve A St Attnd	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Line pressure Command) MVB Fail Limit ELSE MVB Fail Limit Increment MVA Fail Timer IF (MVB Fail Timer IF (Mode Valve B Trnstn (see mode valve A trnstn description) Set Mode Valve B St Fnl Fault Pending) ELSE (Set Mode Valve B Trnstn Fault Pending)) Increment fail counter Set MVB Fail Timer = 0	# Diag Max Press = **Mode Valve B Eng Off Dly Lim** = **Mode Valve B Eng Off ML Lim** > MVB Fail Limit = TRUE = TRUE = TRUE **ModeVlvB_TrnstnDly [ETRS attained range NeutHi, ETRS command range Drive]** **ModeVlvB_TrnstnDly [ETRS attained range NeutHi, ETRS command range NeutLo]**	(see mode valve A st attnd description) OR (0 line pressure command AND Mode Valve B Position))) IF Diagnostic Enable AND Mode Valve B pressure command (ETRS commanded direction AND ETRS Diagnostic Range) Increment Delay Timer Delay Limit Delay Timer Set Mode Valve B sensor Fault Pending IF (Mode Valve B sensor Fault Pending AND (ETRS Commanded Dirctn AND (Park Servo Position OR 0 line pressure command)) Execute Mode Valve B Fail	= TRUE = HIGH = 1.00 < 25.00 = Drive, NeutLo, Park = Reverse, NeutHi, NeutShf = ModeVlvB_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit = TRUE = TRUE = Park # PARK = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvB_TrnstnDly [ETRS attained range NeutHi, ETRS command range Park] **ModeVlvB_TrnstnDly [ETRS attained range NeutShf, ETRS command range Drive]** **ModeVlvB_TrnstnDly [ETRS attained range NeutShf, ETRS command range NeutLo]** **ModeVlvB_TrnstnDly [ETRS attained range NeutShf, ETRS command range Park]** **ModeVlvB_TrnstnDly [ETRS attained range Reverse, ETRS command range Drive]** **ModeVlvB_TrnstnDly [ETRS attained range Reverse, ETRS command range NeutLo]** **ModeVlvB_TrnstnDly [ETRS attained range Reverse, ETRS command range Park]** **ModeVlvB_FnlDly [ETRS attained range Drive, ETRS command range NeutLo]**	IF ETRS Commanded Dirctn Execute Mode Valve B Fail) IF ((Mode Valve B Trnstn (see mode valve B trnstn description) AND (Mode Valve A Trnstn (see mode valve A trnstn description) OR Mode Valve A St Attnd (see mode valve A st attnd description) OR P27EC Fault Active OR Mode Valve A sensor Fault Pending) (ETRS commanded direction AND ETRS Diagnostic Range) Increment Delay Timer Final Limit Final Timer Set Mode Valve B sensor Fault Pending IF Mode Valve B sensor	= Drive or NeutLo = TRUE = TRUE = TRUE = TRUE = TRUE = Park or NeutLo = Drive or Park = ModeVlvB_FnlDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Final Limit = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvB_FnlDly [ETRS attained range Drive, ETRS command range Park] **ModeVlvB_FnlDly [ETRS attained range Park, ETRS command range NeutLo]** **ModeVlvB_TrnstnDly [ETRS attained range NeutLo, ETRS command range Drive]** **ModeVlvB_TrnstnDly [ETRS attained range NeutLo, ETRS command range Park]** **ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range Drive]** **ModeVlvB_FnlDly [ETRS attained range Drive, ETRS command range NeutHi]** **ModeVlvB_FnlDly [ETRS attained range Drive, ETRS command range NeutLo]** **ModeVlvB_FnlDly [ETRS attained range Drive, ETRS command range NeutShfl_**	Fault Pending Execute Mode Valve B Fail) P18ACTest Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18ADTest Fail This Key On P27F0 Test Fail This Key On	 = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvB_FnlDly [ETRS attained range Drive, ETRS command range Reverse] ModeVlvB_FnlDly [ETRS attained range NeutHi, ETRS command range Drive] ModeVlvB_FnlDly [ETRS attained range NeutHi, ETRS command range NeutLo] ModeVlvB_FnlDly [ETRS attained range NeutHi, ETRS command range NeutShf] ModeVlvB_FnlDly [ETRS attained range NeutHi, ETRS command range Park] ModeVlvB_FnlDly [ETRS attained range NeutHi, ETRS command range Reverse] ModeVlvB_FnlDly [ETRS attained range NeutLo, ETRS command range Drive] ModeVlvB_FnlDly [ETRS attained range NeutLo, ETRS command range NeutHi]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvB_FnlDly [ETRS attained range NeutLo, ETRS command range NeutShf] ModeVlvB_FnlDly [ETRS attained range NeutLo, ETRS command range Park] ModeVlvB_FnlDly [ETRS attained range NeutLo, ETRS command range Reverse] ModeVlvB_FnlDly [ETRS attained range NeutShf, ETRS command range Drive] ModeVlvB_FnlDly [ETRS attained range NeutShf, ETRS command range NeutHi] ModeVlvB_FnlDly [ETRS attained range NeutShf, ETRS command range NeutLo] ModeVlvB_FnlDly [ETRS attained range NeutShf, ETRS command range Park] ModeVlvB_FnlDly [ETRS attained range NeutShf, ETRS command range Reverse]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvB_FnlDly [ETRS attained range Park, ETRS command range Drive] ModeVlvB_FnlDly [ETRS attained range Park, ETRS command range NeutHi] ModeVlvB_FnlDly [ETRS attained range Park, ETRS command range NeutShf] ModeVlvB_FnlDly [ETRS attained range Park, ETRS command range Reverse] ModeVlvB_FnlDly [ETRS attained range Reverse, ETRS command range Drive] ModeVlvB_FnlDly [ETRS attained range Reverse, ETRS command range NeutHi] ModeVlvB_FnlDly [ETRS attained range Reverse, ETRS command range NeutLo] ModeVlvB_FnlDly [ETRS attained range Reverse, ETRS command range NeutShf]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvB_FnlDly [ETRS attained range Reverse, ETRS command range Park]				
			Mode Valve A Position ETRS command direction AND mode valve B pressure IF ((High Side Driver 1 AND High Side Driver 2 AND Line Pressure Control) MVB engine off delay lim AND MVB engine off fail lim) ELSE MVB engine off delay lim AND MVB engine off fail lim Increment MVB engine off delay MV engine off delay Set Mode Valve B Engine Off Fault Pending	# LOW # NeutShf, NeutHi, Reverse < 295.00 = TRUE = TRUE # Diag Max Press > **Mode Valve B Eng Off Dly Lim** > **Mode Valve B Eng Off ML Lim** > MVB engine off delay lim	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) AND (hydraulic system pressure available OR auto stop active) GF9 engine off diagnsotic enable P18ACTest Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active	= TRUE = FALSE = FALSE = TRUE = 1.00 = FALSE = FALSE = FALSE = FALSE	IF Mode Valve B Engine Off Fault Pending = TRUE Increment MVB engine off fail timer MVB engine off fail timer > MVB engine off fail lime update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control Valve B Stuck Off	P18AD	This diagnostic monitor detects a Mode Valve B 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 B Position Sensor State changes correctly with mode valve state command.	Mode Valve B Position ETRS commanded direction AND mode valve B pressure IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion) IF (Mode Valve B Trnstn Fault Pending AND Mode Valve B St Fnl Fault Pending) MVB Fail Limit Increment MVB Fail Timer	# HIGH = Reverse, NeutHi, NeutShf > 295.00 = TRUE = FALSE = FALSE = **Mode Valve B Fail Lim**	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18ACTest Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18ADTest Fail This Key On P27F0 Test Fail This Key On IF (Mode Valve B Position OR Mode Valve B Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail	= TRUE = TRUE = ETRS diagnostic range = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **Mode Valve B Final State** # Mode Valve B Command > **Mode Vlv StdySt Park Dly Lim** = PARK # PARK < 450.00 = Diag Min Press	MVB Fail Timer > MVB Fail Limit update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control) Execute Fail ELSE Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Fail	= NeutLo = PARK < 450.00 = Diag Min Press = DRIVE || REVERSE = PARK > 450.00 # Diag Min Press > **ETRS Mode Valve B turbine delay** = Slip Detected		
			Mode Valve A Position IF (ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail descritpion)	# HIGH = TRUE	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)	= TRUE = TRUE	mode valve B fail count PARK > 2.00 counts mode valve B fail count OUT OF PARK > 2.00 counts	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			IF (Mode Valve B Trnstn Fault Pending AND Mode Valve A St Fnl Fault Pending) MVB Fail Limit ELSE IF (Mode Valve B Trnstn Fault Pending) MVB Fail Limit ELSE IF (Mode Valve B St Fnl Fault Pending) MVB Fail Limit ELSE IF (High Side Driver 1 AND High Side Driver 2 AND Line pressure Command) MVB Fail Limit ELSE MVB Fail Limit	 = FALSE = FALSE = **Mode Valve B Fail Lim** = TRUE = ModeVlvB_TrnstnDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift) = TRUE = ModeVlvB_FnlDly [ETRS diagnostic range][ETRS commanded direction] (see supporting tables for specific delay associated with each shift)ModeVlvlA_ = TRUE = TRUE # Diag Max Press = **Mode Valve B Eng Off Dly Lim** =	Auto-Stop Active High Side Driver 1 High Side Driver 2 ETRS commanded direction ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AFTest Fail This Key On IF ((((Mode Valve B St Attnd (see mode valve B st attnd description) AND Mode Valve B Trnstn (see mode valve B trnstn description))AND (Diagnostic Range OR Mode Valve A Trnstn (see mode valve A trnstn description) OR Mode Valve A St Attnd (see mode valve A st attnd description) OR (0 line pressure command AND Mode Valve B Position)))	= FALSE = TRUE = TRUE # ETRS diagnostic range = Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = NeutShf = TRUE = TRUE = TRUE = HIGH	update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			Increment MVB Fail Timer IF (MVB Fail Timer IF (Mode Valve B Trnstn (see mode valve A trnstn description) Set Mode Valve B St Fnl Fault Pending) ELSE (Set Mode Valve B Trnstn Fault Pending)) Increment fail counter Set MVB Fail Timer = 0	**Mode Valve B Eng Off MLLim** > MVB Fail Limit = TRUE = TRUE = TRUE **ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range NeutHi]** **ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range NeutLo]** **ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range NeutShf]** **ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range Park]**	IF Diagnostic Enable AND Mode Valve B pressure command (ETRS Commanded Dirctn OR (ETRS Commanded Dirctn AND ETRS Diagnostic Range) Increment Delay Timer Delay Limit Delay Timer Set Mode Valve B sensor Fault Pending IF (Mode Valve B sensor Fault Pending AND (ETRS Commanded Dirctn AND (Park Servo Position OR 0 line pressure command)) Execute Mode Valve B Fail IF ((ETRS Commanded Dirctn AND ETRS Commanded	= 1.00 > 295.00 # Drive or Park = Park = Drive = ModeVlvB_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit = TRUE = TRUE = Park # PARK = TRUE # Drive or Park # Park		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvB_TrnstnDly [ETRS attained range Drive, ETRS command range Reverse]	Dirctn) Execute Mode Valve B Fail			
				ModeVlvB_TrnstnDly [ETRS attained range NeutLo, ETRS command range NeutHi]	IF (ETRS Diagnostic Range AND Park Servo Position	 = Park # OUT OF PARK		
				ModeVlvB_TrnstnDly [ETRS attained range NeutLo, ETRS command range NeutShf]	Execute Mode Valve B Fail)) P18ACTest Fail This Key On	 = FALSE		
				ModeVlvB_TrnstnDly [ETRS attained range NeutLo, ETRS command range Reverse]	P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18ADTest Fail This Key On	= FALSE = FALSE = FALSE = FALSE		
				ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range NeutHi]	P27F0 Test Fail This Key On	= FALSE		
				ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range NeutLo]				
				ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range NeutShf]				
				ModeVlvB_TrnstnDly [ETRS attained range Park, ETRS command range Reverse]				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				ModeVlvB_TrnstnDly [ETRS attained range NeutHi, ETRS command range NeutShf] ModeVlvB_TrnstnDly [ETRS attained range NeutHi, ETRS command range Reverse] ModeVlvB_TrnstnDly [ETRS attained range NeutShf, ETRS command range NeutHi] ModeVlvB_TrnstnDly [ETRS attained range NeutShf, ETRS command range Reverse] ModeVlvB_TrnstnDly [ETRS attained range Reverse, ETRS command range NeutShf]				

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	P18AE	This diagnostic monitor detects the Mode Valve A Solenoid stuck in the hydraulic on state.	Mode valve position sensor A	# Mode valve low	ETRS Performance Diag Enabl (see ETRS performance diag enabl description)	= TRUE	mode enable valve fail count > 2.00 counts	Type A, 1 Trips
			mode enable valve stuck on delay timer	>= **ETRS mode valve fail delay limit**			update rate 6.25 milleseconds	
					ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description)	= TRUE		
			increment fail counter					
					Auto-Stop Active	= FALSE		
					High Side Driver 1	= TRUE		
					High Side Driver 2	= TRUE		
					mode valve performance diagnostic monitor enable	= 1.00		
					P18AETest Fail This Key On	= FALSE		
					ETRS command direction	= PARK		
					ETRS range	= DRIVE		
					transmssion fluid tempertaure	> 0.00 °C		
					transmssion fluid tempertaure	< 255.99 °C		
					P2812 Fault Active	= FALSE		
					P2815 Fault Active	= FALSE		
					P0962 Fault Active	= FALSE		
					P2738 Fault Active	= FALSE		
					P0797 Fault Active	= FALSE		
					P2715 Fault Active	= FALSE		
					P18AA Fault Active	= FALSE		
					P18AB Fault Active	= FALSE		
					P27EC Fault Active	= FALSE		
					P27EB Fault Active	= FALSE		
					P27ED Fault Active	= FALSE		
					P27EE Fault Active	= FALSE		
					Mode Valve A init hi	= FALSE		
					Mode Valve A sensor FP	= FALSE		
					Mode Valve B sensor FP	= FALSE		
					Mode Valve A Trnstn FP	= FALSE		
					Mode Valve B Trnstn FP	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IF Mode Valve A Command OR 0 line pressure command OR Test Delay Execute Mode Enable Valve Stuck On Test	= LOW = TRUE > **Mode Enable Valve Test Delay Lim**		

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	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.	Park Position Sensor A P17FC fault active P17FA fault active P17FB fault active P18E7Test Fail This Key On Park positin sensor A FP IF (ETRS commanded direction AND ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) IF 0 Line Pressure Command Delay Limit ELSE Delay Limit) ELSE IF ((High Side Driver 1 High Side Driver 2 Line pressure control) Delay Limit ELSE	# Park Position Sensor B = FALSE = FALSE = FALSE = FALSE = FALSE = PARK = TRUE = TRUE > **Park Vlv Stk Off ZL DLy Lim** > **Park Vlv Stk Off Dly Lim** = TRUE = TRUE # Diag Max Line > **Park Vlv Stk Off Eng Off Lim**	ETRS Performance Diag Enabl (see ETRS performance Diag Enabl description) High Side Driver 1 High Side Driver 2 diagnostic monitor enable IF (ETRS Commanded Dirctn Diagnostic Park State (see diagnostic park state definition) Park Servo Position IF ((ETRS Hydraulic Pressure Avail (see ETRS Hydraulic Pressure Avail description) OR (ETRS commanded direction AND PISA Fail Count (Mode Valve A position OR Mode Valve B position)) IF P17E7 fault active AND P17F5 fault active AND P17F6 fault active AND Park position sensor B FP AND P18E8Test Fail This Key On AND Park Position Sensor B) OR	= TRUE = TRUE = TRUE = 1.00 # Park = OUT OF PARK # OUT OF PARK = TRUE = NeutLo = 0 # LOW # LOW = FALSE = FALSE = FALSE = FALSE = FALSE = OUT OF PARK	Fail Count > 2.00 update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					IF			
			Delay Limit)	> **Park Vlv Stk Off ML Eng Off Lim**	(ETRS Commanded Dirctn	# Park		
					Diagnostic Park State (see diagnostic park state definition)	= PARK		
			ELSE					
			Delay Limit	> **Park Servo Stk On Delay Lim**	Park Servo Position	# Park		
					P17E7 fault active AND	= FALSE		
			Increment Delay Timer		P17F5 fault active AND	= FALSE		
					P17F6 fault active AND	= FALSE		
			Delay Timer	> Delay Limit	Park position sensor B FP AND	= FALSE		
			Increment Fail Timer		P18E8Test Fail This Key On	= FALSE		
			Fail Timer	> 0.25				
					Park Position Sensor B AND	= OUT OF PARK		
			Increment Fail Counter					
					Park Position Sensor A)	= PARK		
					Execute Park Position Sensor A Performance			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmissio	P18E8	This diagnostic monitor	Park Position Sensor B	# Park Position Sensor	ETRS Performance Diag	= TRUE	Fail Count >	Type A,
n Park Valve		detects park valve		A	Enabl (see ETRS		2.00	1 Trips
Position		position sensor B			performance Diag Enabl	= TRUE		
Sensor/		performance faults, the	P17FC fault active	= FALSE	description)		update rate 6.25	
Switch "B"		sensor is indicating not	P17FA fault active	= FALSE	High Side Driver 1	= TRUE	milleseconds	
Performance		park when command is	P17FB fault active	= FALSE	High Side Driver 2	= TRUE		
		park, or sensor does	P18E7Test Fail This Key	= FALSE				
		not transition when	On		diagnostic monitor enable	= 1.00		
		park is not	Park positin sensor A FP	= FALSE				
		commanded.			IF			
			IF		((ETRS Commanded	= Park		
					Dirctn			
			(ETRS commanded	= PARK	Diagnostic Park State	= PARK		
			direction AND		(see diagnostic park state			
					definition)			
			ETRS Hydraulic Pressure	= TRUE	Park Servo Position	# PARK		
			Avail (see ETRS hydraulic					
			pressure avail description)		IF			
					(ETRS Hydraulic	= TRUE		
			IF		Pressure Avail (see ETRS			
					hydraulic pressure avail			
			0 Line Pressure	= TRUE	description) OR			
			Command		(ETRS Hydraulic	= FALSE		
					Pressure Avail AND			
			Delay Limit	>	Power Mode Prev to	# OFF		
				Park Vlv Stk Off ZL	ACC))			
			ELSE	**DLy Lim**				
					P17FC fault active AND	= FALSE		
			Delay Limit)	>	P17FA fault active AND	= FALSE		
				Park Vlv Stk Off Dly	P17FB fault active AND	= FALSE		
			ELSE	**Lim**	P18E7Test Fail This Key	= FALSE		
					On AND			
			IF		Park positin sensor A FP	= FALSE		
					AND			
			((High Side Driver 1	= TRUE	Park Positin Sensor A)	= Park		
			High Side Driver 2	= TRUE				
				# Diag Max Line	OR			
			Line pressure control)					
					IF			
			Delay Limit	>	((ETRS Commanded	= Park		
					Dirctn AND			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ELSE Delay Limit) ELSE Delay Limit Increment Delay Timer Delay Timer Increment Fail Timer Fail Timer Increment Fail Counter	**Park Vlv Stk Off Eng Off Lim** > **Park Vlv Stk Off ML Eng Off Lim** > **Park Servo Stk On Delay Lim** > Delay Limit > 0.25	Diagnostic Park State (see diagnostic park state definition) AND Park Position Sensor A AND P17FC fault active AND P17FA fault active AND P17FB fault active AND P18E7Test Fail This Key On AND Park positin sensor A FP) OR IF ((ETRS Commanded Dirctn Diagnostic Park State (see diagnostic park state definition) Park Servo Position IF (ETRS commanded direction AND PISA Fail Count (Mode Valve A position OR Mode Valve B position)) IF (Park Position Sensor A AND P17FC fault active AND P17FA fault active AND P17FB fault active AND P18E7Test Fail This Key On AND Park positin sensor A FP)) Execute Park Position Sensor B Performance	= OUT OF PARK = PARK = FALSE = FALSE = FALSE = FALSE = FALSE # Park = OUT OF PARK # OUT OF PARK = NeutLo = 0 # LOW # LOW = OUT OF PARK = FALSE = FALSE = FALSE = 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 > 6 counts within sample count of 2,400 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	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	****************************** 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 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 > -999.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

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 clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,500.0 RPM > 450.0 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	> 1.000 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 P178F P17C6 P17C4 P17C7 P172A P172B		
					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 > 0.80 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time >0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	***************************** = 1 Boolean = 1 Boolean >9.00 volts = 1 Boolean = 1 Boolean >9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Stuck On Fail Offset Time NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100	

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 GF9 C4 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available (hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) **************************** range shift state diagnostic clutch test transmission output shaft speed ((C4 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE > -999 kPa =TRUE =TRUE ***************************** # range shift complete = OFF GOING CLUTCH TEST > 89.0 RPM = TRUE = 1 (1 to enable, 0 to disable)	seconds exhaust delay by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C4 off going clutch command pressure)	< 113 kPa	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: **C4 exhaust delay garage shift** closed throttle downshift: **C4 exhaust delay closed throttle down shift** negative torque upshift: **C4 exhaust delay negative torque up shift** open throttle downshift: **C4 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: **C1 Powered Upshift Tq Based Pres Clip** OR **C2 Powered Upshift Tq Based Pres Clip** OR **C3 Powered Upshift Tq Based Pres Clip** OR **C5 Powered Upshift Tq Based Pres Clip** OR **C6 Powered Upshift Tq Based Pres Clio**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						coasting downshift dependent on oncoming clutch: **C1 Coasting Downshift Tq Based Pres Clip** OR **C2 Coasting Downshift Tq Based Pres Clip** OR **C3 Coasting Downshift Tq Based Pres Clip** OR **C5 Coasting Downshift Tq Based Pres Clip** OR **C6 Coasting Downshift Tq Based Pres Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C4 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					calculation			
					*****************************	*****************************		
					conditions needed to trigger test:			
					(current shift type AND	# Garage shift		
					shift type enable cal for current shift type)	**Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable)		
					OR			
					(Intrusive shift active AND	= FALSE		
					shift type enable cal for garage shift AND	= 0 (0 will enable, 1 will enable)		
					Attained Gear AND	= NEUTRAL OR commanded gear		
					(stuck on enable cal for forward garge shifts AND	= 0(0 to disable, 1 to enable)		
					driver requested direction AND	= FORWARD		
					commanded gear) OR	= a FORWARD gear		
					(stuck on enable cal for reverse garage shifts AND	= 0(0 to disable, 1 to enable)		
					driver requested direction AND	= REVERSE		
					commanded gear))	= REVERSE		
					clutch stuck off intrusive shift active	= FALSE		
					startle mitigation active (see note on startle mitigation below)	= FALSE		
					(new clutch controller has			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					been initalized OR transitioning to a different clutch controller)	= TRUE = 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 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		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 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 > 0.30 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 High	P2721	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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	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 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 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 > -999.00 kPa = TRUE = TRUE ***************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

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 (GF9 C57R) clutch pressure control solenoid.			OR engine speed OR transmission input shaft speed)	 > 1,500.0 RPM > 450.0 RPM		
					C5 clutch slip speed valid	= TRUE (all speed sensors are functional for lever node clutch slip speed calculation)		
					C5 clutch pressured map	= mapped to line pressure, C5 clutch pressure has reached fully applied state		
					(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)	= 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE		
					range shift state	= range shift complete	> 1.000 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 P178F P17C6 P17C4 P17C7 P172A P172B		
					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 > 0.40 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time >0.15 seconds Add fail time offset according to shift type: open throttle upshift: **Clutch Stuck On Fail Offset Time PU Shifts** open throttle downshift: **Clutch Stuck On Fail Offset Time PD Shifts** garage shift: **Clutch Stuck On Fail Offset Time GS Shifts** closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			****************************** system-level enables: use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage)	****************************** = 1 Boolean = 1 Boolean >9.00 volts = 1 Boolean = 1 Boolean >9.00 volts	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Stuck On Fail Offset Time NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 millisecond update battery voltage time > 0.100 seconds run crank voltage time > 0.100	

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 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available (hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable) **************************** range shift state diagnostic clutch test transmission output shaft speed ((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE > -999 kPa =TRUE =TRUE ***************************** # range shift complete = OFF GOING CLUTCH TEST > 89.0 RPM = TRUE = 1 (1 to enable, 0 to disable)	seconds exhaust delay by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C5 off going clutch command pressure)	 < 145 kPa	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: **C5 exhaust delay garage shift** closed throttle downshift: **C5 exhaust delay closed throttle down shift** negative torque upshift: **C5 exhaust delay negative torque up shift** open throttle downshift: **C5 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(engine torque AND Primary oncoming stuck on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	> 8,192 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: **C1 Powered Upshift Tq Based Pres Clip** OR **C2 Powered Upshift Tq Based Pres Clip** OR **C3 Powered Upshift Tq Based Pres Clip** OR **C4 Powered Upshift Tq Based Pres Clip** OR **C6 Powered Upshift Tq Based Pres Clip** coastinq downshift	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C6_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						dependent on oncoming clutch: **C1 Coasting Downshift Tq Based Pres Clip** OR **C2 Coasting Downshift Tq Based Pres Clip** OR **C3 Coasting Downshift Tq Based Pres Clip** OR **C4 Coasting Downshift Tq Based Pres Clip** OR **C6 Coasting Downshift Tq Based Pres Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C5 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					******************************	******************************		
					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	= FALSE		
					shift type enable cal for garage shift AND	= 0 (0 will enable, 1 will enable)		
					Attained Gear AND	= NEUTRAL OR commanded gear		
					(stuck on enable cal for forward garge shifts AND	= 0(0 to disable, 1 to enable)		
					driver requested direction AND	= FORWARD		
					commanded gear) OR	= a FORWARD gear		
					(stuck on enable cal for reverse garage shifts AND	= 0(0 to disable, 1 to enable)		
					driver requested direction AND	= REVERSE		
					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 OR	= TRUE		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					****************************** 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 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:	P172AP172B ******************************		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 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_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 (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R clutch, or CVT TCC Control solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 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 E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R, 10 speed C1356789, 8 speed C45678R, or CVT TCC Control solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage 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 F Stuck On	P2731	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 transmission input shaft	shift type is power down shift: C6 clutch slip speed OR shift type is garage shift: C6 clutch slip speed ELSE shift is another type: C6 clutch slip speed update fail time 6.25 milliscond update Attained Gear OR Attained Gear	 < 50.00 RPM < 100.00 RPM < 50.00 RPM = First Lock = First Freewheel			Base fail time: shift type is power down shift: fail time > 0.80 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.
		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 a clutch pressure control solenoid stuck on test is disabled. This			****************************** 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	****************************** = 1 Boolean = 1 Boolean >9.00 volts = 1 Boolean = 1 Boolean >9.00 volts = TRUE Boolean	**Clutch Stuck On Fail Offset Time CD Shifts** negative torque upshift: **Clutch Stuck On Fail Offset Time NU Shifts** clutch staging shift: **Clutch Stuck On Fail Offset Time STGR Shifts** update fail count, fail count > 3 counts 6.25 milliscond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		diagnostic monitor is relative to the GF9 C6 C6789/Selectable One Way Clutch (SOWC) CBR1, or, GR10 C6 C45678910R, clutch pressure control solenoid.			driver circuit enabled			
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> -999 kPa =TRUE =TRUE		
					*****************************	******************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 89.0 RPM		
					((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)		
					OR			
					C6 off qoinq clutch		exhaust delav bv	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					command pressure) (engine torque AND Primary oncoming stuck on torque enable cal) OR	< 235 kPa > 8,192 Nm = 0 (0 is enable, 1 is enable)	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: **C6 exhaust delay garage shift** closed throttle downshift: **C6 exhaust delay garage shift** negative torque upshift: **C6 exhaust delay negative torque up shift** open throttle downshift: **C6 exhaust delay open throttle power down shift**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					(primary oncoming clutch active	= TRUE		
					primary on coming control state	# clutch fill phase		
					primary on coming commanded pressure)	> pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: **C1 Powered Upshift Tq Based Pres Clip** OR **C2 Powered Upshift Tq Based Pres Clip** OR **C3 Powered Upshift Tq Based Pres Clip** OR **C4 Powered Upshift Tq Based Pres Clip** OR **C5 Powered Upshift Tq Based Pres Clip** coasting downshift dependent on oncoming clutch: **C1 Coasting Downshift Tq Based Pres Clip** OR **C2 Coasting Downshift Ta Based Pres Clio**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OR **C3 Coasting Downshift Tq Based Pres Clip** OR **C4 Coasting Downshift Tq Based Pres Clip** OR **C5 Coasting Downshift Tq Based Pres Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND shift type enable cal for current shift type)	# Garage shift **Clutch Stuck On Shift** **= Type Enable** (0 table value will disable,		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state	1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0 (0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0 (0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state transitions)		

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 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			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			
			Intrusive Neutral Event Timer AND C6 Fail counter has already achieved 1 fail count (as determined from previous C6 pressure control solenoid stuck on logic)	> 5 counts	Previous Binary clutch control abort reason Binary clutch Neutral release time Active Clutch Controller Binary Clutch control state Vehicle speed source: Wheel speed sensors present (Wheel speed error OR Neutral release state timer)	= No Abort **> Binary Clutch Neutral Release Time Out** = Garage Shift = SOWC Release # Trans Output Speed AND # Average Driven wheel AND # Single Driven wheel AND # Trans Internal Speed # Non Driven = TRUE **> Binary Clutch C1 Neutral Release Time Out**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					Clutch 1 percent filled OR (Clutch slip source AND Clutch 1 slip speed AND Selected Range) Attained Gear Direction OR Cmnd Gear Direction OR Attained Gear OR Scheduled Gear OR (Transmission Oil Temp Sensor FA AND Trans Oil Temp) ***************************** The following DTCs not FAor FP: P176B, P176C, P176D	< 1.00 % # NO SOURCE AVAILABLE **Binary Clutch C1 Slip** **> Threshold** # PARK, REVERSE, Or NEUTRAL # Forward # Forward # 1st Lock < 1st Lock = FALSE **Binary Clutch Cold** **> Inhibit Thresh** *****************************	**Binary Clutch C1 FEM Neutral Release Thresh**	

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	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	****************************** 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 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 > -999.00 kPa = TRUE = TRUE **************************** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 89.0 RPM > 2.00 %		

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 (GF9 C6789/SOWC) clutch pressure control solenoid.			engine speed OR transmission input shaft speed)	> 1,500.0 RPM > 450.0 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	> 1.000 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 P178F P17C6 P17C4 P17C7 P172A P172B		
					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)	P2733	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C6 clutch slip speed OR shift type is garage shift: C6 clutch slip speed ELSE shift is another type: C6 clutch slip speed update fail time 6.25 milliscond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.80 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 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	

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 clutch pressure control solenoid.			TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available	= TRUE		
					(hydraulic pressure OR Park/Neutral Stuck on FP OR Neutral Staging Line Pressure Disable)	> -999 kPa =TRUE =TRUE		
					*****************************	*****************************		
					range shift state	# range shift complete		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					transmission output shaft speed	> 89.0 RPM		
					((C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable)	= TRUE = 1 (1 to enable, 0 to disable)	exhaust delay by shift tvoe:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					OR C6 off going clutch command pressure)	< 235 kPa	closed throttle upshift: **C6 exhaust delay closed throttle lift foot up shift** open throttle upshift: **C6 exhaust delay open throttle power on up shift** garage shifts: **C6 exhaust delay garage shift** closed throttle downshift: **C6 exhaust delay garage shift** negative torque upshift: **C6 exhaust delay negative torque up shift** open throttle downshift: **C6 exhaust delay open throttle power down shift**	
					(engine torque AND Primary oncoming stuck	> 8,192 Nm = 0 (0 is enable, 1 is		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					on torque enable cal) OR (primary oncoming clutch active primary on coming control state primary on coming commanded pressure)	enable) = TRUE ‡ clutch fill phase > pressure clip threshold according to shift type: closed/open throttle upshifts dependent on oncoming clutch: **C1 Powered Upshift Tq Based Pres Clip** OR **C2 Powered Upshift Tq Based Pres Clip** OR **C3 Powered Upshift Tq Based Pres Clip** OR **C4 Powered Upshift Tq Based Pres Clip** OR **C5 Powered Upshift Tq Based Pres Clip** coasting downshift dependent on oncoming clutch: **C1 Coasting Downshift Tq Based Pres Clip**	Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: **C1_Oncoming Post-Torque Phase Delay** OR **C2_Oncoming Post-Torque Phase Delay** OR **C3_Oncoming Post-Torque Phase Delay** OR **C4_Oncoming Post-Torque Phase Delay** OR **C5_Oncoming Post-Torque Phase Delay**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
						OR **C2 Coasting Downshift Tq Based Pres Clip** OR **C3 Coasting Downshift Tq Based Pres Clip** OR **C4 Coasting Downshift Tq Based Pres Clip** OR **C5 Coasting Downshift Tq Based Pres Clip** clip thresholds for all other shift types: garage shifts: **Clutch Clip Press GS Shifts** negative torque upshift: **Clutch Clip Press NU Shifts** open throttle downshift: **Clutch Clip Press PD Shifts**		
					C6 clutch slip speed valid, all speed sensors are functional for lever node clucth slip speed calculation	= TRUE		
					******************************	******************************		
					conditions needed to trigger test:			
					(current shift type AND	# Garage shift		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state	**Clutch Stuck On Shift = Type Enable** (0 table value will disable, 1 will enable) = FALSE = 0 (0 will enable, 1 will enable) = NEUTRAL OR commanded gear = 0(0 to disable, 1 to enable) = FORWARD = a FORWARD gear = 0(0 to disable, 1 to enable) = REVERSE = REVERSE = FALSE = FALSE = TRUE = TRUE transitions to TestState or TUT_HOLD (see note below about state		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control (PC) Solenoid F Control Circuit Open	P2736	Controller specific circuit diagnoses 9 speed (C6789/SOWC CBR1) clutch, 10 speed C45678910R clutch, 8 speed Line Pressure Control Circuit, or CVT binary pump, solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_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 (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_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 (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_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 (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 >8.00 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 Range/ Performance	P27EC	Sensor signal fails to transition when solenoid mode valve control commands to PARK, DRIVE or REVERSE occur.	Mode Valve A Position ETRS Commanded Dirctn AND mode valve A pressure ETRS Commanded Dirctn AND mode valve A pressure IF (Mode Valve A Steady State Fault Pending) MVA Sensor Fail Limit Increment MVA Sensor Fail Timer	≠ **Mode Valve A Final State** = Drive > 195.00 # Drive < 25.00 = TRUE = **Mode Valve A Steady State Fail Lim**	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18AATest Fail This Key On P27EB Fault Active AND P27ED Fault Active AND P27EE Fault Active AND P18ABTest Fail This Key On AND P27EC Test Fail This Key On IF (Mode Valve A Position OR Mode Valve A Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn IF (Park Servo State AND Line Pressure AND Line Pressure Control))	= TRUE = TRUE = ETRS diagnostic range = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **Mode Valve A Final State** # Mode Valve A Command > **Mode Vlv StdySt Park Dly Lim** = PARK = PARK > 450.00 # Diag Min Press	IF MVA Sensor Fail > MVA Sensor Fail Limit 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.
					Execute Sensor Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control)) Execute Sensor Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control) Execute Slip Determination Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Sensor Fail	 = NeutLo # OUT OF PARK > 450.00 # Diag Min Press = Drive or Reverse # PARK < 450.00 = Diag Min Press > **ETRS Mode Valve A turbine delay** = No Slip Detected		
			Mode Valve A Position	≠ **Mode Valve A Final State**	ETRS Performance Diag Enabl (see ETRS performance diag enabl	= TRUE	IF MVA Sensor Fail > MVA Sensor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ETRS Commanded Dirctn AND mode valve A pressure ETRS Commanded Dirctn AND mode valve A pressure IF (Mode Valve A Steady State Fault Pending) MVA Sensor Fail Limit Increment MVA Sensor Fail Timer	= Drive > 195.00 = Park < 25.00 = FALSE = **Mode Valve A Fail Lim**	description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) Auto-Stop Active High Side Driver 1 High Side Driver 2 ETRS commanded direction ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AFTest Fail This Key On IF (((Mode Valve A St Attnd (see mode valve A st attnd description) AND Mode Valve A Trnstn (see mode valve A trnstn description))AND (Diagnostic Range OR Mode Valve B Trnstn (see mode valve B trnstn	 = TRUE = FALSE = TRUE = TRUE # ETRS diagnostic range = Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = NeutShf = TRUE	Fail Limit update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					description) OR Mode Valve B St Attnd (see mode valve B st attnd description) OR (0 line pressure command AND Mode Valve A Position))) IF Diagnostic Enable AND ((ETRS commanded direction AND Mode Valve A pressure OR 0 line pressure command) OR (ETRS commanded direction AND ETRS diagnostic range AND Mode Valve A pressure)) Increment Delay Timer Delay Limit Delay Timer Set Mode Valve A sensor Fault Pending P18AATest Fail This Key On P27EB Fault Active P27ED Fault Active P27EE Fault Active P18ABTest Fail This Kev	 = TRUE = TRUE = HIGH = 1.00 = Park < 25.00 = TRUE = Drive = Park > 195.00 = ModeVlvA_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift) > Delay Limit = FALSE = FALSE = FALSE = FALSE = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					On P27EC Test Fail This Key On Execute Sensor Fault	= 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 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 >8.00 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 >8.00 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 B Position Sensor/ Switch Circuit/Open (GF9 and CVT Only)	P27EF	The diagnostic monitor detects an illegal voltage on the mode valve B 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 >8.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control B Position Sensor/ Switch Circuit Range/ Performance	P27F0	Sensor signal fails to transition when solenoid mode valve control commands to PARK, REVERSE, NEUTRAL HI, NEUTRAL LO, NEUTRAL SHIFT or DRIVE occur.	Mode Valve B Position ETRS Commanded Dirctn AND mode valve B pressure OR ETRS Commanded Dirctn AND mode valve A pressure IF (Mode Valve A Steady State Fault Pending) MVB Sensor Fail Limit Increment MVB Sensor Fail Timer	≠ **Mode Valve B Final State** = Reverse > 295.00 = Park, NeutLo, Drive < 25.00 = TRUE = **Mode Valve B Steady State Fail Lim**	ETRS Performance Diag Enabl (see ETRS performance diag enabl description) ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) ETRS commanded direction P18ACTest Fail This Key On P27EF Fault Active P27F1 Fault Active P27F2 Fault Active P18ADTest Fail This Key On P27F0 Test Fail This Key On IF (Mode Valve B Position OR Mode Valve B Position) Increment Steady State Delay Steady State Delay IF (ETRS Commanded Dirctn IF (Park Servo State AND Line Pressure AND Line Pressure Control))	= TRUE = TRUE = ETRS diagnostic range = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **Mode Valve B Final State** # Mode Valve B Command > **Mode Vlv StdySt Park Dly Lim** = PARK = PARK < 450.00 # Diag Min Press	IF MVB Sensor Fail > MVB Sensor Fail Limit 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.
					Execute Sensor Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State AND Line Pressure AND Line Pressure Control)) Execute Sensor Fail ELSE IF (ETRS Commanded Dirctn IF (Park Servo State OR Line Pressure OR Line Pressure Control) Execute Slip Determination Increment Slip Delay Slip Delay Slip Detected (see mode valve slip detected definition) Execute Sensor Fail	 = NeutLo # OUT OF PARK > 450.00 # Diag Min Press = Drive or Reverse # PARK < 450.00 = Diag Min Press > **ETRS Mode Valve B turbine delay** = Slip Detected		
			Mode Valve B Position	≠ **Mode Valve B Final State**	ETRS Performance Diag Enabl (see ETRS performance diag enabl description)	= TRUE	IF MVB Sensor Fail > MVB Sensor Fail Limit	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
			ETRS Commanded Dirctn AND mode valve B pressure ETRS Commanded Dirctn AND mode valve A pressure IF (Mode Valve A Steady State Fault Pending) MVB Sensor Fail Limit Increment MVB Sensor Fail Timer	= Reverse, NeutLo, NeutHi, NeutShf > 295.00 = Park < 25.00 = TRUE = **Mode Valve B Steady State Fail Lim**	ETRS Hydraulic Pressure Avail (see ETRS hydraulic pressure avail description) Auto-Stop Active High Side Driver 1 High Side Driver 2 ETRS commanded direction ((Driver command P2812 Fault Active P2815 Fault Active P0970 Fault Active P2720 Fault Active) OR (Driver command P2814 Fault Active (P0968 Fault Active P0971 Fault Active) OR (P2718 Fault Active P2721 Fault Active))) Mode Enbl Vlv Stk On Test P18AFTest Fail This Key On IF ((((Mode Valve B St Attnd (see mode valve B st attnd description) AND Mode Valve B Trnstn (see mode valve B trnstn description))AND (Diagnostic Range OR Mode Valve A Trnstn (see mode valve A trnstn description) OR Mode Valve A St Attnd (see mode valve A st	= TRUE = FALSE = TRUE = TRUE # ETRS diagnostic range = Park = FALSE = FALSE = FALSE = FALSE # Park = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = NeutShf = TRUE = TRUE	update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					attnd description) OR			
					(0 line pressure command AND	= TRUE		
					Mode Valve B Position)))	= HIGH		
					IF			
					Diagnostic Enable	= 1.00		
					((ETRS Commanded Dirctn AND	= Park		
					Mode Valve B pressure AND	< 25.00		
					Park Servo Position) OR	= PARK		
					(ETRS Commanded Dirctn AND	= Reverse, NeutLo, NeutHi, NeutShf		
					ETRS Diagnostic Range AND	= Park		
					Park Servo Position AND	= OUT OF PARK		
					Mode Valve B pressure))	> 295.00		
					Increment Delay Timer			
					Delay Limit	= ModeVlvB_TrnstnDly [ETRS diagnostic range] [ETRS commanded direction] (see supporting tables for specific delay associated with each shift)		
					Delay Timer	> Delay Limit		
					Set Mode Valve B sensor Fault Pending	= TRUE		
					P18ACTest Fail This Key On	= FALSE		
					P27EF Fault Active	= FALSE		
					P27F1 Fault Active	= FALSE		
					P27F2 Fault Active	= FALSE		
					P18ADTest Fail This Kev	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					On P27F0 Test Fail This Key On Execute Sensor Fault	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Transmission Range Control B Position Sensor/ Switch Circuit Low (GF9 and CVT Only)	P27F1	The diagnostic monitor detects a ground short or open circuit fault on the mode valve B 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 >8.00 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 B Position Sensor/ Switch Circuit High (GF9 and CVT Only)	P27F2	The diagnostic monitor detects a short to voltage on the mode valve B 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 >8.00 volts > 1.00 seconds = CeTRGR_e_InternalETRS	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	

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 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 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	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 G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit, 10 speed Line Pressure Circuit, 8 speed TCC Control, or CVT Mode Valve A Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type A, 1 Trips
					battery voltage	> 9.00 volts and < 32.00 volts	> 1.00 seconds	
					(run crank voltage 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 H Performance /Stuck Off - GF9 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** see supporting table = 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 % > 800.0 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 > 2.500 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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					service fast learn active battery voltage run crank voltage (PTO active OR PTO disable calibration) accelerator pedal position accelerator pedal position range shift state transmission fluid temperature transmission fluid temperature engine torque engine torque P2817 test fail this key on (TCC control mode OR TCC control mode) attained gear attainded gear slip DTCs not fault active	= FALSE >9.00 volts >9.00 volts = FALSE = 1 Boolean > 8.0 % < 100.0 % = range shift complete > -6.66 °C < 130.0 °C > 50.0 Nm < 8,191.8 Nm = FALSE = ON mode (controlled slip mode) = LOCK > CeCGSR_e_CR_Third < 25.00 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D	see supporting table battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					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 - GF9 specific	P2818	The diagnostic monitor detects if the TCC Variable Force Solenoid (VFS) H is on incorrectly, the solenoid electrical circuit not damaged, but the solenoid has failed hydraulically to an on state. In this failure mode hydraulic fluid is routed wrongly to engage both the TCC Regulator Valve and the TCC Control Valve. This will allow hydraulic fluid pressure to immediately apply the TCC when the Clutch Select Valve is disabled.	When Stuck on crash detected monitor TCC Slip - torque convert slip speed = ABS(engine speed - transmission input shaft speed) WHILE TCC Slip AND TCC Slip THEN Increment TCC Stuck On fail timer 25 millisecond update rate	 > -50.0 RPM < 30.0 RPM	Diagnostic monitor enable accelerator pedal position signal available hydraulic pressure available: Engine speed service fast learn active battery voltage run crank voltage P281B fault active P281D fault active P281E fault active P0716 fault active P0717 fault active P07BF fault active P07C0 fault active P0722 fault active P0723 fault active P077C fault active P077D fault active P0722 fault pending P0723 fault pending P0716 fault pending P0717 fault pending P07BF fault pending P07C0 fault pending ****************************** PRNDL PRNDL Commanded gear Commanded gear (PTO active OR PTO disable calibration)	= 1 (1 enable, 0 disable) = TRUE = TRUE > 500.0 RPM = FALSE >9.00 volts >9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ****************************** # NEUTRAL # REVERSE # NEUTRAL # REVERSE = FALSE = 1 Boolean	fail time > 1.500 seconds increment fail count fail count > 4 counts 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 fluid temperature	> -6.66 °C		
					transmission fluid temperature	< 130.00 °C		
					engine torque	> 55.0 Nm		
					engine torque	< 800.0 Nm		
					P2818 test fail this key on	= FALSE		
					vehicle speed	< 45.0 KPH		
					engine speed	> 400.0 RPM		
					engine speed	< 5,500.0 RPM		
					accelerator pedal position	< 95.0 %		
					4WD low state	= FALSE		
					(driver shift mode active OR	= FALSE		
					driver shift mode calibration)	= 0 Boolean		
					(clucth control solenoid stuck on OR stuck OFF intrusive shift active)	= FALSE		
					P0746 fault pending	= FALSE		
					P0747 fault pending	= FALSE		
					P0776 fault pending	= FALSE		
					P0777 fault pending	= FALSE		
					P0796 fault pending	= FALSE		
					P0797 fault pending	= FALSE		
					P2714 fault pending	= FALSE		
					P2715 fault pending	= FALSE		
					P2723 fault pending	= FALSE		
					P2724 fault pending	= FALSE		
					P2732 fault pending	= FALSE		
					P2733 fault pending	= FALSE		
					P2820 fault pending	= FALSE		
					P2821 fault pending	= FALSE		
					vehicle speed	< 8.0 KPH		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					accelerator pedal position accelerator pedal position hysteresis **************************** when: break latch state (clutch select valve solenoid) IF previous break latch state (clutch select valve solenoid) set stuck on test time and begin time down, ELSE stuck on test time must time down from calibration value to zero (0.0) seconds break latch state (clutch select valve solenoid) AND previous break latch state (clutch select valve solenoid) THEN initialize control valve test time, control valve test time must time down from calibration value to zero (0.0) seconds WHILE control valve test time OR TCC Stuck On fail time IF TCC slip Decelelation	> 4.0 % > 1.0 % ***************************** = disabled (clutch select valve not transitioning) = complete (clutch select valve transition complete) = **P2818 stuck on test time** see supporting tables = clutch select valve solenoid mutliplexed to TCC hydraulic = disabled (clutch select valve not transitioning) = **P2818 (GF9 specific) control valve test time** see supporting tables ≠ 0 ≠ 0 <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					AND TCC slip Stuck on crash detected	**P2818GF9 TCC Stuck On Crash Decel limit** < **P2818GF9 Establish crash slip limit** = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Pressure Control Solenoid H Control Circuit Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit, 10 speed TCC Control Circuit, 8 speed T93 Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 9.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_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 B, 2 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_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 H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit, 10 speed TCC Control Circuit, 8 speed Default Valve Control Circuit, or CVT Mode Valve B Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time			fail time > 0.30 seconds out of sample time > 0.50 seconds	Type B, 2 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 J Stuck Off (GF9)	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 clutch select valve solenoid failed hydraulically off. The clutch select valve is used to route hydraulic fluid to, either, the selectable one way clutch hydraulic circuit used to attain transmission 1st gear lock state, or, to the C6 - C6789 clutch hydraulic circuit necessary for transmission higher gear states. When the clutch select valve is failed hydraulically off, and transmission is in 1st gear lock state, it is possible to measure low C6 - C6789 clutch slip speed or 6th gear transmission ratio, since hydraulic fluid is routed to the clutch C6 - C6789. This can be determined based on transmission lever node design, the	(gear ratio AND gear ratio) OR C6 clutch slip speed update fail time 6.25 milliscond update	< 1.700 > 1.200 < 20.0 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	****************************** = 1 Boolean = 1 Boolean >9.00 volts = 1 Boolean = 1 Boolean >9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean	fail time > 0.250 seconds, update fail count, fail count > 3 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.
		transmission input shaft speed, the transmission output shaft speed, and one transmission intermediate shaft speed, while not commanding 6th-9th gear. This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.			service solenoid cleaning procedure active hydraulic pressure available ***************************** diagnostic monitor enabled transmission output shaft speed transmission fluid temperature transmission fluid temperature (command gear AND attained gear) OR (attained gear AND SOWC state) C6 clutch slip speed valid ***************************** DTCs not fault pending DTCs not fault active	= FALSE Boolean = TRUE ***************************** = 1 (1 to enable, 0 to disable) > 35 RPM > -256.00 °C < 130.0 °C = 1st lock = 1st lock = 2nd lock = APPLY COMPLETE = TRUE ***************************** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 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		

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 (GF9)	P2821	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 select pressure control solenoid must be hydraulically off and the clutch select valve in the off state, to allow hydraulic fluid supply to the C3 (CB38) or C4 (C4) or C5 (C57R) clutches, such that when activated, commanded gear 3rd or 4th or 5th can be attained. With the clutch select valve pressure control solenoid failed hydraulically on, commanded gear 3rd or 4th or 5th cannot be attained. In the failure mode, the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM, when commanding 3rd or 4th or 5th gear, but due to the clutch select pressure control solenoid failed hydraulically on and not	Cx clutch slip speed fail compare C3 (CB38) OR C4 (C4) OR C5 (C57R) update Cx clutch slip speed fail time 6.25 milliscond update once intrusive gear is commanded and clutch select stuck on test active remains and Cx clutch fail count limit occurs, increment clutch select valve solenoid stuck on fail count and time up clutch select stuck on test gear time 6.25 milliscond update	 > 200.0 RPM > 200.0 RPM > 200.0 RPM = TRUE			Cx clutch slip speed fail time > (C3 (CB38) 1.00 seconds OR C4 (C4) 1.00 seconds OR C5 (C57R) 1.00 seconds) update Cx fail count, Cx fail count > (C3 (CB38) 2 counts OR C4 (C4) 2 counts OR C5 (C57R) 2 counts) Cx clutch fail count limit occurs 6.25 milliscond update clutch select valve solenoid stuck on fail count > 2 counts OR clutch select stuck on test gear time > 9.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		individual clutch control faults. It is thus necessary, when individual clutch slip occurs in 3rd or 4th or 5th gear and counted toward the clutch pressure control solenoid stuck on failure, for an intrusive gear commanded from 3rd or 4th or 5th to verify the clutch slip in the remaining gear states. The individual clutch slip that occurs in those intrusive gears, 3rd or 4th or 5th, is also counted toward the clutch pressure control solenoid stuck on failure. As individual clutch slip is accumulated in each commanded gear 3rd or 4th or 5th, that failure time is the verification of the clutch pressure control solenoid failed hydraulically on. 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			****************************** 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 hydraulic pressure available ****************************** diagnostic monitor enable	****************************** = 1 Boolean = 1 Boolean >9.00 volts = 1 Boolean = 1 Boolean >9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ****************************** = 1 Boolean	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.
		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 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 select pressure control solenoid is failed hydraulically on, C3 (CB38) or C4 (C4) or C5 (C57R) clutches cannot 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			P2821 test fail this key on test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete Cx indicates any one of the 3 clutches: C3 (CB38) OR C4 (C4) OR 05 (C57R) enable Cx clutch slip speed fail compare when: diagnostic clutch test Cx ((startle mitigation active OR (startle mitigation active	= FALSE = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE # NEUTRAL TEST = range shift completed = TRUE # range shift completed = HOLDING CLUTCH = FALSE = TRUE	initialize range shift complete time= 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
		active. 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, which, must take priority over this clutch select pressure control solenoid stuck off diagnostic monitor. All clutch pressure control 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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.			AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable FALSE (startle mitigation) clutch steady state adaptive active transmission output shaft speed Cx clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test Cx set to HOLDING CLUTCH when: clutch solenoid test state ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) Cx clutch pressured map ***************************** clutch select stuck on test active set to TRUE when:	# initial startle mitigation gear = FALSE = 0 Boolean = FALSE > 89.0 RPM > 2.00 % > 1,500.0 RPM = NEUTRAL TEST = FALSE = TRUE # initial startle mitigation gear = mapped to line pressure, Cx clutch pressure has transtioned from off-applying-applied *****************************		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					command gear clutch control solenoid test state any Cx clutch fail count limit occurs break latch state, clutch select valve hydraulic latch fluid is applied, hydraulic latch fluid force balance acts with clutch select valve return spring, to force the clutch select valve to the off postion in normal operation, allowing hydraulic fluid to C3 (CB38) C4 (C4) and C5 (C57R) clutches clutch select stuck on test active driver direction (PRNDL) change request, select intrusive gear to verify clutch select valve solenoid when HOLDING CLUTCH: C3 (CB38) C4 (C4) C5 (C57R) enable clutch select stuck on test gear time 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	# REVERSE = NEUTRAL TEST = complete = TRUE = FALSE = CeCGSR_e_Fourth = CeCGSR_e_Fifth = CeCGSR_e_Fourth		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
					P2715 P2724 P2733 P2821			
					*****************************	*****************************		
					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		

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_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 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_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 > 0.10 seconds out of sample time > 0.17 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 ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Serial Peripheral Interface Bus 2	P30D7	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor.		Run/Crank voltage	>=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 ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
P3186 (Internal Control Module Security Peripheral Performance)	P3186	This DTC indicates the security peripheral has experienced an internal fault indicating that MAC verification results are unreliable.	MAC verification has falsely passed a configurable number of times.	2.00	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures equals or exceeds In a window of	>= 5.00 counts >=100.00 milliseconds	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run Run/Crank ignition voltage If power mode = Accessory:	 > 15,000.00 milliseconds > 11.00 Volts >= 5,000.00 milliseconds >11.00 Volts <=32.00 Volts >=11.00 Volts Enabled	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.
					Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending Power Mode is not run/ crank Battery voltage	>=11.00 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Lost Communication With 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 $054:	>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 <=32.00 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 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 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 $03E: Message $27A: Message $36E: Message $3A4: Message $4E9: Message $512: Message $581: Message $583: Message $5A1: Message $5A2: Message $711:	>10,000.00 milliseconds >10,000.00 milliseconds > 9,325.00 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 <=32.00 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.
				>10,000.00 milliseconds	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 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 $039: Message $0B9: Message $52A:	 >10,000.00 milliseconds > 9,825.00 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 <=32.00 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 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.
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: SD19P_ARC: SrlDat19_Prtctd: SD18P_ARC: SrlDat18_Prtctd: SD20P_ARC: SrlDat20_Prtctd: SD71_ARC: SD71_CS: VSADP_ARC:	 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 8.00 fail counts out of 18.00 sample counts 3.00 fail counts out of	Message frame containing the Alive Rolling Count (ARC),Protection Value (PV), or Checksum (CSLIM) is available on the bus. All the following conditions are met for: Battery voltage Accessory mode to off mode transition not pending If controller is a non-OBD controller then battery voltage Controller type: OBD Controller	>= 5,000.00 milliseconds >= 11.00 volts <=32.00 volts	Executes in 12.5ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
				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	<=32.00 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 Diagnostic-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	<=32.00 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: SPMP_ARC: SysPwrMode_Prtctd: PltfTrnsTUDSwStARC:	3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts 3.00 fail counts out of 10.00 sample counts	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 <=32.00 volts	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
Invalid Data Received From 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	<=32.00 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 <=32.00 volts	Executes in 12.5ms loop.	Emissions Neutral Diagnostic-Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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 $370: Message $3C2: Message $3C3: Message $3C4: Message $4DC: Message $5F9:	>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 <=32.00 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 $03B: Message $03C: Message $042: Message $270: Message $27B: Message $369: Message $3AA: Message $3AB: Message $4EB: Message $51C: Message $586: Message $5C9: Message $5CA:	> 9,925.00 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 > 7,450.00 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 <=32.00 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 $5CB: Message $5CC: Message $5CD:	milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled 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 $01E: Message $02F: Message $045: Message $064: Message $0CC: Message $0E2: Message $262: Message $266: Message $267: Message $268: Message $2A9: Message $2C1: Message $2C3:	 >10,000.00 milliseconds >418.75 milliseconds >10,000.00 milliseconds >418.75 milliseconds >10,000.00 milliseconds > 387.50 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >200.00 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 <=32.00 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 $2C6: Message $2C7: Message $36F: Message $3A5: Message $3A6: Message $3B4: Message $4EC: Message $4F0: Message $516: Message $521: Message $5D1: Message $5D5: Message $709: Message $70A:	>10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds > 9,325.00 milliseconds > 9,325.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds >10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled 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.
			Message $70E:	>10,000.00 milliseconds >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_SecKey SlotFailLimit	Calibration enable	= 1.00 Boolean		Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Ilium.
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	0.300	0.300	0.275	0.200	0.200

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_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

Initial Supporting table - P171D 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 - P171D predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - 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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	25	25	25

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

y/x	-40	-20	0	20	120
1	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	2	2	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	177	160	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	125	125	4,096	327	389	4,096	125
CeTRMR_e_C2_Clutch	341	341	341	4,096	2,120	761	465
CeTRMR_e_C3_Clutch	234	234	235	1,229	4,096	671	234
CeTRMR_e_C4_Clutch	412	412	459	989	1,506	4,096	412
CeTRMR_e_C5_Clutch	133	133	133	242	303	614	4,096
CeTRMR_e_C6_Clutch	169	169	169	269	314	479	241
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	327	125	4,096	4,096	4,096	4,096	50
CeTRMR_e_C2_Clutch	341	487	4,096	2,125	761	465	50
CeTRMR_e_C3_Clutch	235	234	1,345	4,096	671	343	50
CeTRMR_e_C4_Clutch	870	412	1,089	1,628	4,096	1,685	50
CeTRMR_e_C5_Clutch	652	133	242	303	614	4,096	50
CeTRMR_e_C6_Clutch	4,096	169	269	314	479	985	50
CeTRMR_e_C7_Clutch	50	4,096	50	50	50	50	50

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	50	50	327	50	50	389	125
CeTRMR_e_C2_Clutch	50	50	4,096	50	50	2,120	341
CeTRMR_e_C3_Clutch	50	50	1,229	50	50	4,096	234
CeTRMR_e_C4_Clutch	50	50	989	50	50	1,506	412
CeTRMR_e_C5_Clutch	50	50	742	50	50	1,129	133
CeTRMR_e_C6_Clutch	50	50	4,096	50	50	4,096	169
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	50	125	4,096	327	389	4,096
CeTRMR_e_C2_Clutch	341	50	341	341	4,096	2,120	761
CeTRMR_e_C3_Clutch	234	50	234	235	1,229	4,096	671
CeTRMR_e_C4_Clutch	412	50	412	459	989	1,506	4,096
CeTRMR_e_C5_Clutch	133	50	133	133	242	303	614
CeTRMR_e_C6_Clutch	169	50	169	169	269	314	479
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	327	125	4,096	50	50	50
CeTRMR_e_C2_Clutch	465	341	487	4,096	50	50	50
CeTRMR_e_C3_Clutch	234	235	234	1,345	50	50	50

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

CeTRMR_e_C4_Clutch	412	870	412	1,089	50	50	50
CeTRMR_e_C5_Clutch	4,096	652	133	242	50	50	50
CeTRMR_e_C6_Clutch	241	4,096	169	269	50	50	50
CeTRMR_e_C7_Clutch	50	50	4,096	50	50	50	50

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	327	50	50	389	125	125	50
CeTRMR_e_C2_Clutch	4,096	50	50	2,120	341	341	50
CeTRMR_e_C3_Clutch	1,229	50	50	4,096	234	234	50
CeTRMR_e_C4_Clutch	989	50	50	1,506	412	412	50
CeTRMR_e_C5_Clutch	742	50	50	1,129	133	133	50
CeTRMR_e_C6_Clutch	4,096	50	50	4,096	169	169	50
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	487	542	542	4,096	4,096	2,125	761
CeTRMR_e_C3_Clutch	234	260	260	1,345	1,345	4,096	671
CeTRMR_e_C4_Clutch	412	459	459	1,089	1,089	1,628	4,096
CeTRMR_e_C5_Clutch	4,096	133	133	242	242	303	614
CeTRMR_e_C6_Clutch	241	169	169	269	269	314	479
CeTRMR_e_C7_Clutch	4,096	4,096	50	50	50	50	50

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	613	389	327	50	
CeTRMR_e_C2_Clutch	465	341	727	2,120	4,096	50	
CeTRMR_e_C3_Clutch	343	235	641	4,096	1,229	50	
CeTRMR_e_C4_Clutch	1,685	870	2,130	1,506	989	50	
CeTRMR_e_C5_Clutch	4,096	652	4,096	1,129	742	50	
CeTRMR_e_C6_Clutch	985	4,096	4,096	4,096	4,096	50	
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	

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	125	125	4,096	327	389	4,096	125
CeTRMR_e_C2_Clutch	341	341	341	4,096	2,120	761	465
CeTRMR_e_C3_Clutch	234	234	235	1,229	4,096	671	234
CeTRMR_e_C4_Clutch	412	412	459	989	1,506	4,096	412
CeTRMR_e_C5_Clutch	133	133	133	242	303	614	4,096
CeTRMR_e_C6_Clutch	169	169	169	269	314	479	241
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	327	125	4,096	4,096	4,096	4,096	50
CeTRMR_e_C2_Clutch	341	487	4,096	2,125	761	465	50
CeTRMR_e_C3_Clutch	235	234	1,345	4,096	671	343	50
CeTRMR_e_C4_Clutch	870	412	1,089	1,628	4,096	1,685	50
CeTRMR_e_C5_Clutch	652	133	242	303	614	4,096	50
CeTRMR_e_C6_Clutch	4,096	169	269	314	479	985	50
CeTRMR_e_C7_Clutch	50	4,096	50	50	50	50	50

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	50	50	327	50	50	389	125
CeTRMR_e_C2_Clutch	50	50	4,096	50	50	2,120	341
CeTRMR_e_C3_Clutch	50	50	1,229	50	50	4,096	234
CeTRMR_e_C4_Clutch	50	50	989	50	50	1,506	412
CeTRMR_e_C5_Clutch	50	50	742	50	50	1,129	133
CeTRMR_e_C6_Clutch	50	50	4,096	50	50	4,096	169
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	50	125	4,096	327	389	4,096
CeTRMR_e_C2_Clutch	341	50	341	341	4,096	2,120	761
CeTRMR_e_C3_Clutch	234	50	234	235	1,229	4,096	671
CeTRMR_e_C4_Clutch	412	50	412	459	989	1,506	4,096
CeTRMR_e_C5_Clutch	133	50	133	133	242	303	614
CeTRMR_e_C6_Clutch	169	50	169	169	269	314	479
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	327	125	4,096	50	50	50
CeTRMR_e_C2_Clutch	465	341	487	4,096	50	50	50
CeTRMR_e_C3_Clutch	234	235	234	1,345	50	50	50

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

CeTRMR_e_C4_Clutch	412	870	412	1,089	50	50	50
CeTRMR_e_C5_Clutch	4,096	652	133	242	50	50	50
CeTRMR_e_C6_Clutch	241	4,096	169	269	50	50	50
CeTRMR_e_C7_Clutch	50	50	4,096	50	50	50	50

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	327	50	50	389	125	125	50
CeTRMR_e_C2_Clutch	4,096	50	50	2,120	341	341	50
CeTRMR_e_C3_Clutch	1,229	50	50	4,096	234	234	50
CeTRMR_e_C4_Clutch	989	50	50	1,506	412	412	50
CeTRMR_e_C5_Clutch	742	50	50	1,129	133	133	50
CeTRMR_e_C6_Clutch	4,096	50	50	4,096	169	169	50
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	487	542	542	4,096	4,096	2,125	761
CeTRMR_e_C3_Clutch	234	260	260	1,345	1,345	4,096	671
CeTRMR_e_C4_Clutch	412	459	459	1,089	1,089	1,628	4,096
CeTRMR_e_C5_Clutch	4,096	133	133	242	242	303	614
CeTRMR_e_C6_Clutch	241	169	169	269	269	314	479
CeTRMR_e_C7_Clutch	4,096	4,096	50	50	50	50	50

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	613	389	327	50	
CeTRMR_e_C2_Clutch	465	341	727	2,120	4,096	50	
CeTRMR_e_C3_Clutch	343	235	641	4,096	1,229	50	
CeTRMR_e_C4_Clutch	1,685	870	2,130	1,506	989	50	
CeTRMR_e_C5_Clutch	4,096	652	4,096	1,129	742	50	
CeTRMR_e_C6_Clutch	985	4,096	4,096	4,096	4,096	50	
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	

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	341	341	50	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	234	4,096	4,096	234	50	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	412	4,096	412	4,096	50	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	50
CeTRMR_e_C7_Clutch	4,096	4,096	50	4,096	50	50	50

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	0	0
CeTRMR_e_C2_Clutch	0	0
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	0	0
CeTRMR_e_C5_Clutch	1	1
CeTRMR_e_C6_Clutch	0	0
CeTRMR_e_C7_Clutch	1	1

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	0	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0
CeTRMR_e_C5_Clutch	1	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	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	0	0	0	0	1
CeTRMR_e_C3_Clutch	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0
CeTRMR_e_C5_Clutch	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	1	1	1	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	0	1	0	0	0
CeTRMR_e_C4_Clutch	0	0	1	0	0
CeTRMR_e_C5_Clutch	0	0	0	1	0
CeTRMR_e_C6_Clutch	0	0	0	0	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	1	
CeTRMR_e_C2_Clutch	0	0	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	0	1	0	1	
CeTRMR_e_C4_Clutch	0	0	0	1	
CeTRMR_e_C5_Clutch	1	0	0	1	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	1	

Initial Supporting table - Illegal Reverse Clutch Combinations

Description: All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Reverse Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalRev_1A	CeTRMR_e_IllegalRev_1Ac	CeTRMR_e_IllegalRev_1Ad	CeTRMR_e_IllegalRev_1Af	CeTRMR_e_IllegalRev_1M	CeTRMR_e_IllegalRev_1Me
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0	0
CeTRMR_e_C5_Clutch	0	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	1	1

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1Md	CeTRMR_e_IllegalRev_1Mf	CeTRMR_e_IllegalRev_2A	CeTRMR_e_IllegalRev_2M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	1	1	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	1	0
CeTRMR_e_C4_Clutch	0	0	0	0	0	1
CeTRMR_e_C5_Clutch	0	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	1	0	0	0	0

Illegal Reverse Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IllegalRev_8	CeTRMR_e_IllegalRev_9	CeTRMR_e_IllegalRev_10
CeTRMR_e_C1_Clutch	1	1	0	0	0	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	0	0	1	0	1
CeTRMR_e_C4_Clutch	0	0	0	0	0	1
CeTRMR_e_C5_Clutch	1	0	1	0	0	1
CeTRMR_e_C6_Clutch	0	1	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	1

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	0	0	0	0

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	1	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	1	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	1	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	1	0	0	0	0

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 - 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	h	1h	1h	1h	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	56	56
CeTGRR_e_Gear2	79	79
CeTGRR_e_Gear3	87	87
CeTGRR_e_Gear4	107	107
CeTGRR_e_Gear5	135	135
CeTGRR_e_Gear6	180	180
CeTGRR_e_Gear7	261	261
CeTGRR_e_Gear8	349	349
CeTGRR_e_Gear9	422	422
CeTGRR_e_Gear10	422	422

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	0.300	0.300	0.275	0.200	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: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

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_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	25	25	25

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	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuc on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

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	0.300	0.300	0.275	0.200	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: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

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_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

Initial Supporting table - P171D 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 - P171D predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - 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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	25	25	25

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	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

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	3.200	2.000	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	1.600	1.100	0.950	0.850	0.850

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	3.200	2.000	0.950	0.850	0.850

Initial Supporting table - C1_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	0.700	0.600

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	1.600	1.100	0.950	0.850	0.850

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	0.212	0.212

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	3.100	1.100	0.950	0.850	0.850

Initial Supporting table - C2_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-2	-1	-1	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	3.000	2.500	1.800	0.650	0.600

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	1.900	1.100	0.950	0.900	0.900

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	1.600	1.100	0.950	0.850	0.850

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	0.387	0.144

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	1.900	1.100	0.950	0.900	0.900

Initial Supporting table - C3_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-1	-1	-1	-1	-1

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	1.400	0.900	0.700	0.663	0.600

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	1.900	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	1.600	1.100	0.950	0.850	0.850

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	0.119	0.119

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	1.900	1.100	0.950	0.850	0.850

Initial Supporting table - C4_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	3.000	2.000	1.750	1.400	1.400

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	3.500	2.300	1.100	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	2	1	1	1	1

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	0.900	0.613	0.450	0.300	0.163

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	3.500	2.300	1.100	0.850	0.850

Initial Supporting table - C5_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	1.600	1.100	0.950	0.850	0.850

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	0.850	0.350	0.300	0.238	0.131

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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	750	750	750	750	750	750

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	690	800	500	850	703	655

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	400	800	500	850	703	655

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 NU Shifts

Description: Used for negative torque up shifts to add additional fail time based on oil temperature

X Unit: transmission fluid temperature °C
Y Units: time (seconds)

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	1	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	0	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	0	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	0.300	0.300	0.275	0.200	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	0.300	0.300	0.275	0.200	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: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

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_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

Initial Supporting table - P171D 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 - P171D predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - 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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	25	25	25

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	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

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	0	0	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 - 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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	150	150	150	150	150

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	2	2	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	177	160	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	125	125	4,096	327	389	4,096	125
CeTRMR_e_C2_Clutch	341	341	341	4,096	2,120	761	465
CeTRMR_e_C3_Clutch	234	234	235	1,229	4,096	671	234
CeTRMR_e_C4_Clutch	412	412	459	989	1,506	4,096	412
CeTRMR_e_C5_Clutch	133	133	133	242	303	614	4,096
CeTRMR_e_C6_Clutch	169	169	169	269	314	479	241
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	327	125	4,096	4,096	4,096	4,096	50
CeTRMR_e_C2_Clutch	341	487	4,096	2,125	761	465	50
CeTRMR_e_C3_Clutch	235	234	1,345	4,096	671	343	50
CeTRMR_e_C4_Clutch	870	412	1,089	1,628	4,096	1,685	50
CeTRMR_e_C5_Clutch	652	133	242	303	614	4,096	50
CeTRMR_e_C6_Clutch	4,096	169	269	314	479	985	50
CeTRMR_e_C7_Clutch	50	4,096	50	50	50	50	50

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	50	50	327	50	50	389	125
CeTRMR_e_C2_Clutch	50	50	4,096	50	50	2,120	341
CeTRMR_e_C3_Clutch	50	50	1,229	50	50	4,096	234
CeTRMR_e_C4_Clutch	50	50	989	50	50	1,506	412
CeTRMR_e_C5_Clutch	50	50	742	50	50	1,129	133
CeTRMR_e_C6_Clutch	50	50	4,096	50	50	4,096	169
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	50	125	4,096	327	389	4,096
CeTRMR_e_C2_Clutch	341	50	341	341	4,096	2,120	761
CeTRMR_e_C3_Clutch	234	50	234	235	1,229	4,096	671
CeTRMR_e_C4_Clutch	412	50	412	459	989	1,506	4,096
CeTRMR_e_C5_Clutch	133	50	133	133	242	303	614
CeTRMR_e_C6_Clutch	169	50	169	169	269	314	479
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	327	125	4,096	50	50	50
CeTRMR_e_C2_Clutch	465	341	487	4,096	50	50	50
CeTRMR_e_C3_Clutch	234	235	234	1,345	50	50	50

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

CeTRMR_e_C4_Clutch	412	870	412	1,089	50	50	50
CeTRMR_e_C5_Clutch	4,096	652	133	242	50	50	50
CeTRMR_e_C6_Clutch	241	4,096	169	269	50	50	50
CeTRMR_e_C7_Clutch	50	50	4,096	50	50	50	50

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	327	50	50	389	125	125	50
CeTRMR_e_C2_Clutch	4,096	50	50	2,120	341	341	50
CeTRMR_e_C3_Clutch	1,229	50	50	4,096	234	234	50
CeTRMR_e_C4_Clutch	989	50	50	1,506	412	412	50
CeTRMR_e_C5_Clutch	742	50	50	1,129	133	133	50
CeTRMR_e_C6_Clutch	4,096	50	50	4,096	169	169	50
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	487	542	542	4,096	4,096	2,125	761
CeTRMR_e_C3_Clutch	234	260	260	1,345	1,345	4,096	671
CeTRMR_e_C4_Clutch	412	459	459	1,089	1,089	1,628	4,096
CeTRMR_e_C5_Clutch	4,096	133	133	242	242	303	614
CeTRMR_e_C6_Clutch	241	169	169	269	269	314	479
CeTRMR_e_C7_Clutch	4,096	4,096	50	50	50	50	50

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	613	389	327	50	
CeTRMR_e_C2_Clutch	465	341	727	2,120	4,096	50	
CeTRMR_e_C3_Clutch	343	235	641	4,096	1,229	50	
CeTRMR_e_C4_Clutch	1,685	870	2,130	1,506	989	50	
CeTRMR_e_C5_Clutch	4,096	652	4,096	1,129	742	50	
CeTRMR_e_C6_Clutch	985	4,096	4,096	4,096	4,096	50	
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	

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	125	125	4,096	327	389	4,096	125
CeTRMR_e_C2_Clutch	341	341	341	4,096	2,120	761	465
CeTRMR_e_C3_Clutch	234	234	235	1,229	4,096	671	234
CeTRMR_e_C4_Clutch	412	412	459	989	1,506	4,096	412
CeTRMR_e_C5_Clutch	133	133	133	242	303	614	4,096
CeTRMR_e_C6_Clutch	169	169	169	269	314	479	241
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	327	125	4,096	4,096	4,096	4,096	50
CeTRMR_e_C2_Clutch	341	487	4,096	2,125	761	465	50
CeTRMR_e_C3_Clutch	235	234	1,345	4,096	671	343	50
CeTRMR_e_C4_Clutch	870	412	1,089	1,628	4,096	1,685	50
CeTRMR_e_C5_Clutch	652	133	242	303	614	4,096	50
CeTRMR_e_C6_Clutch	4,096	169	269	314	479	985	50
CeTRMR_e_C7_Clutch	50	4,096	50	50	50	50	50

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	50	50	327	50	50	389	125
CeTRMR_e_C2_Clutch	50	50	4,096	50	50	2,120	341
CeTRMR_e_C3_Clutch	50	50	1,229	50	50	4,096	234
CeTRMR_e_C4_Clutch	50	50	989	50	50	1,506	412
CeTRMR_e_C5_Clutch	50	50	742	50	50	1,129	133
CeTRMR_e_C6_Clutch	50	50	4,096	50	50	4,096	169
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	50	125	4,096	327	389	4,096
CeTRMR_e_C2_Clutch	341	50	341	341	4,096	2,120	761
CeTRMR_e_C3_Clutch	234	50	234	235	1,229	4,096	671
CeTRMR_e_C4_Clutch	412	50	412	459	989	1,506	4,096
CeTRMR_e_C5_Clutch	133	50	133	133	242	303	614
CeTRMR_e_C6_Clutch	169	50	169	169	269	314	479
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	327	125	4,096	50	50	50
CeTRMR_e_C2_Clutch	465	341	487	4,096	50	50	50
CeTRMR_e_C3_Clutch	234	235	234	1,345	50	50	50

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

CeTRMR_e_C4_Clutch	412	870	412	1,089	50	50	50
CeTRMR_e_C5_Clutch	4,096	652	133	242	50	50	50
CeTRMR_e_C6_Clutch	241	4,096	169	269	50	50	50
CeTRMR_e_C7_Clutch	50	50	4,096	50	50	50	50

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	327	50	50	389	125	125	50
CeTRMR_e_C2_Clutch	4,096	50	50	2,120	341	341	50
CeTRMR_e_C3_Clutch	1,229	50	50	4,096	234	234	50
CeTRMR_e_C4_Clutch	989	50	50	1,506	412	412	50
CeTRMR_e_C5_Clutch	742	50	50	1,129	133	133	50
CeTRMR_e_C6_Clutch	4,096	50	50	4,096	169	169	50
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	50

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	125	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C2_Clutch	487	542	542	4,096	4,096	2,125	761
CeTRMR_e_C3_Clutch	234	260	260	1,345	1,345	4,096	671
CeTRMR_e_C4_Clutch	412	459	459	1,089	1,089	1,628	4,096
CeTRMR_e_C5_Clutch	4,096	133	133	242	242	303	614
CeTRMR_e_C6_Clutch	241	169	169	269	269	314	479
CeTRMR_e_C7_Clutch	4,096	4,096	50	50	50	50	50

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	613	389	327	50	
CeTRMR_e_C2_Clutch	465	341	727	2,120	4,096	50	
CeTRMR_e_C3_Clutch	343	235	641	4,096	1,229	50	
CeTRMR_e_C4_Clutch	1,685	870	2,130	1,506	989	50	
CeTRMR_e_C5_Clutch	4,096	652	4,096	1,129	742	50	
CeTRMR_e_C6_Clutch	985	4,096	4,096	4,096	4,096	50	
CeTRMR_e_C7_Clutch	50	50	50	50	50	50	

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	341	341	50	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	234	4,096	4,096	234	50	4,096	4,096
CeTRMR_e_C4_Clutch	4,096	412	4,096	412	4,096	50	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	50
CeTRMR_e_C7_Clutch	4,096	4,096	50	4,096	50	50	50

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	0.300	0.300	0.275	0.200	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: transmission fluid temperature °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.200

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	0	0
CeTRMR_e_C2_Clutch	0	0
CeTRMR_e_C3_Clutch	0	0
CeTRMR_e_C4_Clutch	0	0
CeTRMR_e_C5_Clutch	1	1
CeTRMR_e_C6_Clutch	0	0
CeTRMR_e_C7_Clutch	1	1

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_lllegalPN.1A	CeTRMR.e.lllegalPN.I Ac	CeTRMR.e.lllegalPN.I Ad	CeTRMR.e.lllegalPN.I Af
CeTRMR_e_C1.Clutch	0	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0
CeTRMR_e_C5_Clutch	1	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	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	0	0	0	0	1
CeTRMR_e_C3_Clutch	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0
CeTRMR_e_C5_Clutch	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	1	1	1	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	0	1	0	0	0
CeTRMR_e_C4_Clutch	0	0	1	0	0
CeTRMR_e_C5_Clutch	0	0	0	1	0
CeTRMR_e_C6_Clutch	0	0	0	0	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.CI .Clutch	0	0	0	1	
CeTRMR_e_C2_Clutch	0	0	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	0	1	0	1	
CeTRMR_e_C4_Clutch	0	0	0	1	
CeTRMR_e_C5_Clutch	1	0	0	1	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	0	0	0	1	

Initial Supporting table - Illegal Reverse Clutch Combinations

Description: All combinations of clutch commands which can lead to drive when the driver is requesting reverse (1 indicates clutch on, 0 incdicates clutch off)

Value Units: Boolean (1 for on, 0 for off)
X Unit: Illegal Clutch Combination
Y Units: Clutch

Illegal Reverse Clutch Combinations - Part 1

y/x	CeTRMR_e_IllegalRev_1A	CeTRMR_e_IllegalRev_1Ac	CeTRMR_e_IllegalRev_1Ad	CeTRMR_e_IllegalRev_1Af	CeTRMR_e_IllegalRev_1M	CeTRMR_e_IllegalRev_1Me
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	0	0	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	0	0
CeTRMR_e_C4_Clutch	0	0	0	0	0	0
CeTRMR_e_C5_Clutch	0	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0	0
CeTRMR_e_C7_Clutch	0	0	0	0	1	1

Illegal Reverse Clutch Combinations - Part 2

y/x	CeTRMR_e_IllegalRev_1Md	CeTRMR_e_IllegalRev_1Mf	CeTRMR_e_IllegalRev_2A	CeTRMR_e_IllegalRev_2M	CeTRMR_e_IllegalRev_3	CeTRMR_e_IllegalRev_4
CeTRMR_e_C1_Clutch	1	1	1	1	1	1
CeTRMR_e_C2_Clutch	0	0	1	1	0	0
CeTRMR_e_C3_Clutch	0	0	0	0	1	0
CeTRMR_e_C4_Clutch	0	0	0	0	0	1
CeTRMR_e_C5_Clutch	0	0	0	0	0	0
CeTRMR_e_C6_Clutch	0	0	0	0	0	0
CeTRMR_e_C7_Clutch	1	1	0	0	0	0

Illegal Reverse Clutch Combinations - Part 3

y/x	CeTRMR_e_IllegalRev_5	CeTRMR_e_IllegalRev_6	CeTRMR_e_IllegalRev_7	CeTRMR_e_IllegalRev_8	CeTRMR_e_IllegalRev_9	CeTRMR_e_IllegalRev_10
CeTRMR_e_C1_Clutch	1	1	0	0	0	1
CeTRMR_e_C2_Clutch	0	0	0	0	1	1
CeTRMR_e_C3_Clutch	0	0	0	1	0	1
CeTRMR_e_C4_Clutch	0	0	0	0	0	1
CeTRMR_e_C5_Clutch	1	0	1	0	0	1
CeTRMR_e_C6_Clutch	0	1	1	1	1	1
CeTRMR_e_C7_Clutch	0	0	0	0	0	1

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	0	0	0	0

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	1	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	1	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	1	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	1	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_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_Directionllnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_Directionllnknown	CeTNSR_e_Directionllnknown	

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	200	300	400	500	600
1	190	200	200	250	300

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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	25	25	25

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	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

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	h	1h	1h	1h	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	56	56
CeTGRR_e_Gear2	79	79
CeTGRR_e_Gear3	87	87
CeTGRR_e_Gear4	107	107
CeTGRR_e_Gear5	135	135
CeTGRR_e_Gear6	180	180
CeTGRR_e_Gear7	261	261
CeTGRR_e_Gear8	349	349
CeTGRR_e_Gear9	422	422
CeTGRR_e_Gear10	422	422

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	0	0	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 - Binary Clutch C1 FEM Neutral Release Thresh

Description:

Value Units: Time (sec)
X Unit: Transmission Oil Temperature (deg C)

y/x	-30	-15	0	10	20	40	80	110	140
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - Binary Clutch C1 Neutral Release Time Out

Description:

Value Units: Time (sec)
X Unit: Transmission Oil Temperature (deg C)

y/x	-30	-15	0	10	20	40	80	110	140
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - Binary Clutch C1 Slip Threshold

Description:

Value Units: RPM
X Unit: Transmission Oil Temperature (deg C)

y/x	-30	-15	0	10	20	40	80	110	140
1	50	50	50	50	50	50	50	50	50

Initial Supporting table - Binary Clutch Cold Inhibit Thresh

Description: Transmission Oil temperature above which SOWC can be commanded on

Value Units: Temperature
X Unit: Gear Selection Mode

y/x	CeCGSI_e_TFT_NormMode	CeCGSI_e_TFT_TUTD_Mode
1	40	15

Initial Supporting table - Binary Clutch Neutral Release Time Out

Description:

Value Units: Time (sec)
X Unit: Transmission Oil Temperature (deg C)

y/x	-30	-15	0	10	20	40	80	110	140
1	2	2	2	2	2	2	2	2	2

Initial Supporting table - C1 Coasting Downshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	681	681	681	681	681

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	3.200	2.000	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	1.600	1.100	0.950	0.850	0.850

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	3.200	2.000	0.950	0.850	0.850

Initial Supporting table - C1 Powered Upshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	2,100	2,100	2,100	2,100	2,100

Initial Supporting table - C1 Onco ing Post-Tor ue Phase DelaD

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C1 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

Initial Supporting table - C2 Coasting Downshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C2 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	525	525	525	525	525

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	0.700	0.600

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	1.600	1.100	0.950	0.850	0.850

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	0.212	0.212

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	3.100	1.100	0.950	0.850	0.850

Initial Supporting table - C2 Powered Upshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C2 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	550	681	813	1,075	1,863

Initial Supporting table - C2_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C2 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-2	-1	-1	0

Initial Supporting table - C3 Coasting Downshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C3 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	363	363	363	363	363

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	3.000	2.500	1.800	0.650	0.600

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	1.900	1.100	0.950	0.900	0.900

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	1.600	1.100	0.950	0.850	0.850

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	0.387	0.144

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	1.900	1.100	0.950	0.900	0.900

Initial Supporting table - C3 Powered Upshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C3 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	438	569	694	950	1,713

Initial Supporting table - C3_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C3 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-1	-1	-1	-1	-1

Initial Supporting table - C4 Coasting Downshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C4 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	463	463	463	463	463

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	1.400	0.900	0.700	0.663	0.600

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	1.900	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	1.600	1.100	0.950	0.850	0.850

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	0.119	0.119

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	1.900	1.100	0.950	0.850	0.850

Initial Supporting table - C4 Powered Upshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C4 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	338	469	600	856	1,638

Initial Supporting table - C4_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C4 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

Initial Supporting table - C5 Coasting Downshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C5 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	356	356	356	356	356

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	3.000	2.000	1.750	1.400	1.400

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	3.500	2.300	1.100	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	2	1	1	1	1

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	0.900	0.613	0.450	0.300	0.163

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	3.500	2.300	1.100	0.850	0.850

Initial Supporting table - C5 Powered Upshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C5 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	569	756	944	1,319	2,431

Initial Supporting table - C5_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C5 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

Initial Supporting table - C6 Coasting Downshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C6 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	300
1	655	655	655	655	655

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	1.600	1.100	0.950	0.850	0.850

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	0.850	0.350	0.300	0.238	0.131

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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C6 Powered Upshift Tq Based Pres Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C6 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	500
1	506	588	669	825	1,306

Initial Supporting table - C6_Oncoming Post-Torque Phase Delay

Description: Post torque phase delay before calculating oncoming clutch clip pressure for powered upshifts when C6 is the oncoming clutch

Value Units: time (seconds)
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	-2	-1	-1	-1	-1

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	750	750	750	750	750	750

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	690	800	500	850	703	655

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	400	800	500	850	703	655

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 NU Shifts

Description: Used for negative torque up shifts to add additional fail time based on oil temperature

X Unit: transmission fluid temperature °C
Y Units: time (seconds)

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	1	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	0	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	0	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	0.300	0.300	0.275	0.200	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	0.300	0.300	0.275	0.200	0.200

Initial Supporting table - ETRS Mode Valve A turbine delay

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.300	1.800	1.000	0.500	0.300

Initial Supporting table - ETRS Mode Valve B turbine delay

Description: ETRS Mode Valve B turbine delay

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.300	1.800	1.000	0.500	0.300

Initial Supporting table - Mode Enable Valve Test Delay Lim

Description: Test Delay for turbine speed

Value Units: Seconds
X Unit: Transmission fluid temp, Deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Valve A Eng Off Dly Lim

Description: used for both engine off mode valve A stability delay time required to enable fail time update and fail time threshold

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	6.100	6.100	6.100	3.100	1.300

Initial Supporting table - Mode Valve A Eng Off ML Lim

Description: Mode Valve A transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded. Temp based.

Value Units: Seconds
X Unit: Degrees C
Y Units: unitless

y/x	-40	-20	0	20	130
1	15	10	5	2	2

Initial Supporting table - Mode Valve A Fail Lim

Description: Mode valve A fail limit after delay has matured

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Valve A Final State

Description: mode valve A position

Value Units: mode valve position
X Unit: ETRS diagnostic range
Y Units: ETRS command direction

Mode Valve A Final State - Part 1

y/x	1	2	3
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Mode Valve A Final State - Part 2

y/x	4	5	6
1	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs
2	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
5	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
6	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
7	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Mode Valve A Final State - Part 3

y/x	7		
1	CeSTGR_e_ETRS_NeutShf		
2	CePSCR_e_ModeValveLow		
3	CePSCR_e_ModeValveLow		
4	CePSCR_e_ModeValveLow		
5	CePSCR_e_ModeValveHigh		
6	CePSCR_e_ModeValveLow		
7	CePSCR_e_ModeValveHigh		

Initial Supporting table - Mode Valve A Steady State Fail Lim

Description: Mode Valve A steady state sensor fault fail limit

Value Units: Seconds
X Unit: Transmissin fluid temp, deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Valve B Eng Off Dly Lim

Description: used for both engine off mode valve B stability delay time required to enable fail time update and fail time threshold

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500

Initial Supporting table - Mode Valve B Eng Off ML Lim

Description: Mode Valve B transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded. Temp based.

Value Units: Seconds
X Unit: Degrees C
Y Units: unitless

y/x	-40	-20	0	20	130
1	15	10	5	2	2

Initial Supporting table - Mode Valve B Fail Lim

Description: Mode valve B fail limit after delay has matured

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Valve B Final State

Description: mode valve B position

Value Units: mode valve B position
X Unit: ETRS diagnostic range

Mode Valve B Final State - Part 1

y/x	1	2	3
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Mode Valve B Final State - Part 2

y/x	4	5	6
1	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs
2	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Mode Valve B Final State - Part 3

y/x	7		
1	CeSTGR_e_ETRS_NeutShf		
2	CePSCR_e_ModeValveLow		
3	CePSCR_e_ModeValveLow		
4	CePSCR_e_ModeValveHigh		
5	CePSCR_e_ModeValveLow		
6	CePSCR_e_ModeValveHigh		
7	CePSCR_e_ModeValveHigh		

Initial Supporting table - Mode Valve B Steady State Fail Lim

Description: Mode Valve B steady state fail limit

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Mode Vlv StdySt Park Dly Lim

Description: fail delay time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.000	0.731	0.244	0.244	0.244

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Drive, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Drive, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Drive, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Drive, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Drive, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutHi, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutLo, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutLo, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutLo, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutLo, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutLo, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutShf, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutShf, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range NeutShf, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Park, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Park, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Park, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	3.450	2.069	0.688	0.413	0.369

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Park, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Park, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Reverse, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Reverse, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Reverse, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_FnlDly[ETRS attained range Reverse, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Drive, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transimssion fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	7.800	6.000	3.300	0.444	0.119

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Drive, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transimssion fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	6.900	4.600	1.150	0.569	0.413

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Drive, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Drive, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	6.900	4.600	1.150	0.462	0.413

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutHi, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutLo, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.600	1.000	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	2.231	1.800	0.875	0.113	0.069

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	3.450	2.069	0.688	0.413	0.369

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	3.450	2.069	0.688	0.413	0.369

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range NeutShf, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.837	1.150	0.688	0.113	0.069

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Park, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Park, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Park, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.381	0.863	0.644	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Park, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	2.125	1.100	0.688	0.250	0.231

Initial Supporting table - ModeVlvA_TrnstnDly[ETRS attained range Reverse, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Drive, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Drive, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	3.450	2.069	0.762	0.369	0.344

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Drive, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Drive, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	3.450	2.069	0.762	0.369	0.344

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Drive, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutHi, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutLo, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutLo, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutLo, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutLo, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutLo, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutShf, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutShf, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutShf, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutShf, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range NeutShf, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Park, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Park, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Park, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	3.450	2.069	0.762	0.369	0.344

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Park, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Park, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_FnlDly[ETRS attained range Reverse, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.163	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	2.069	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Drive, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.331	0.950	0.512	0.212	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range NeutLo]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.331	0.950	0.512	0.212	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.725	0.688	0.344	0.163	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	2.331	0.950	0.512	0.212	0.137

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutHi, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range Drive]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range NeutHi]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range NeutShf]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range Park]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.000	0.750	0.500	0.250	0.200

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutLo, ETRS command range Reverse]

Description:

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	7.000	5.500	1.100	0.500	0.400

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range Drive]

Description: Mode Valve B transition delay from NeutShf to Drive

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	0	0	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range NeutHi]

Description: Mode Valve B transition delay from NeutShf to NeutHi

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	1	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range NeutLo]

Description: Mode Valve B transition delay from NeutShf to NeutLo

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	3	2	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range NeutShf, ETRS command range Park]

Description: Mode Valve B transition delay from NeutShf to Park

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	3	2	1	0	0

Initial Supporting table - ModeVlvB _TrnstnDly[ETRS attained range NeutShf, ETRS command range Reverse]

Description: Mode Valve B transsition delay from NeutShf to Rvrs

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	1	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range Drive]

Description: Mode Valve B transition delay from Park to Drive

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	1	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range NeutHi]

Description: Mode Valve B Transition delay from Park to NeutHi

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	7	6	1	1	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range NeutLo]

Description: Mode Valve B transition delay from Park to NeutLo

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	7	6	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range NeutShf]

Description: Mode Valve B transition from Park to NeutShf

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	7	6	1	1	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Park, ETRS command range Reverse]

Description: Mode Valve B transition delay from Park to Reverse

Value Units: Seconds
X Unit: Trasnmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	7	6	1	1	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Reverse, ETRS command range Drive]

Description: Mode Valve B transition delay Reverse to Drive

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Reverse, ETRS command range NeutLo]

Description: Mode Valve B transtion delay Reverse to NeutLo

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	1	1	0	0

Initial Supporting table - ModeVlvB _TrnstnDly[ETRS attained range Reverse, ETRS command range NeutShf]

Description: Mode Valve B transition delay [Rvrs][NeutShf]

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	1	1	1	0	0

Initial Supporting table - ModeVlvB_TrnstnDly[ETRS attained range Reverse, ETRS command range Park]

Description: Mode valve A transition delay timer for Reverse to Park

Value Units: seconds
X Unit: transmission fluid tep, deg C

y/x	-40	-20	0	20	130
1	2	1	1	0	0

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	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 GF9 Establish crash slip limit

Description: RPM limit used to establish slip crashed when TCC oil became available

Value Units: RPM
X Unit: percent

y/x	0	15	25	50	75
1	100	100	160	233	300

Initial Supporting table - P2818 GF9 TCC Stuck On Crash Decel limit

Description: TCC slopip decel limit to establish slip crashed when TCC oil became available for TCC Stuck On diagnostics

Value Units: RPM per Second
X Unit: transmission fluid temperature °C
Y Units: percent

y/x	-7	10	40
0	-600	-600	-600
15	-600	-600	-600
25	-900	-900	-900
50	-1,200	-1,200	-1,200
75	-1,500	-1,500	-1,500

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

Initial Supporting table - Park Servo Stk On Delay Lim

Description: Delay timer limit for Park servo to Move from P to OOP

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	4	3	1	0	0

Initial Supporting table - Park Valve Stuck Off Fail Lim

Description: Fail timer limit for Park Servo to move from OOP to P. Temp based .

Value Units: Seconds
X Unit: Transmission fluid temp Deg C

y/x	-40	-20	0	20	130
1	0	0	0	0	0

Initial Supporting table - Park Vlv Stk Off Dly Lim

Description: Delay timer limit for Park Servo to move from OOP to P

Value Units: Seconds
X Unit: Trasnmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	1	1	1	1

Initial Supporting table - Park Vlv Stk Off Dly Lim

Description: Delay timer limit for Park Servo to move from OOP to P

Value Units: Seconds
X Unit: Trasnmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	2	1	1	1	1

Initial Supporting table - Park Vlv Stk Off Eng Off Lim

Description: Park Servo transition delay timer when engine is off

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	3	3	2	1	1

Initial Supporting table - Park Vlv Stk Off Eng Off Lim

Description: Park Servo transition delay timer when engine is off

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	3	3	2	1	1

Initial Supporting table - Park Vlv Stk Off ML Eng Off Lim

Description: Park Servo transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded.

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	15	10	5	2	2

Initial Supporting table - Park Vlv Stk Off ML Eng Off Lim

Description: Park Servo transition limit when the engine and one or more HSD's are off or when max line pressure is being commanded.

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	15	10	5	2	2

Initial Supporting table - Park Vlv Stk Off ZL DLy Lim

Description: Delay timer limit for Park Servo to move from OOP to P. Temp based.
 * Only used when ZeroLimit is active to set Park Servo Stuck Off.

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	6	6	3	1	1

Initial Supporting table - Park Vlv Stk Off ZL DLy Lim

Description: Delay timer limit for Park Servo to move from OOP to P. Temp based.
* Only used when ZeroLimit is active to set Park Servo Stuck Off.

Value Units: Seconds
X Unit: Transmission fluid temp, deg C

y/x	-40	-20	0	20	130
1	6	6	3	1	1

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	0.300	0.300	0.275	0.200	0.200

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	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 GF9 Establish crash slip limit

Description: RPM limit used to establish slip crashed when TCC oil became available

Value Units: RPM
X Unit: percent

y/x	0	15	25	50	75
1	100	100	160	233	300

Initial Supporting table - P2818 GF9 TCC Stuck On Crash Decel limit

Description: TCC slopip decel limit to establish slip crashed when TCC oil became available for TCC Stuck On diagnostics

Value Units: RPM per Second
X Unit: transmission fluid temperature °C
Y Units: percent

y/x	-7	10	40
0	-600	-600	-600
15	-600	-600	-600
25	-900	-900	-900
50	-1,200	-1,200	-1,200
75	-1,500	-1,500	-1,500

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

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	0.300	0.300	0.275	0.200	0.200

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_DirectionForward	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionReverse
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_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

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_DirectionForward	CeTNSR_e_DirectionForward	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 5

y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionReverse	CeTNSR_e_DirectionUnknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	

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	1.000	1.000

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	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

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	4	4

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	2.000	2.000

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	172.0	172.0

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	172.0	172.0

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	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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	25	25	25

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	0	0	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